NATIONAL CAR BUILDER

VOLUME XV.
NUMBER 12

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The Exhibition will be opened in May, 1885, and will continue open for a period of about six months.
Division I. (Inventions) will be devoted to illustrations of Apparatus, Appliances, Processes and Products, invented or brought into use since 1862.
Division II. (Music) will consist of examples of Musical Instruments of a date not earlier than the commencement of the present century; and of Historic Collections of Musical Instruments and Appliances, and Paintings, Engravings and Drawings representing Musical subjects, without any restriction as to date.
Medals in Gold, Silver and Bronze, and Diplomas of Honor will be awarded on the recommendation of Juries.
No charge will be made for space.
It is expected that
AMERICAN INVENTIONS
will take a prominent place in this
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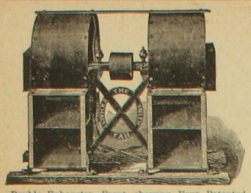
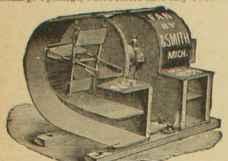


Double Exhauster—Front, showing Four Patented Discharge Openings, where others have only Two.



Section showing TWO Patent DISCHARGE CHAMBERS for EACH Fan Wheel, where others have only One.

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DETROIT EMERY WHEEL CO., per Gilbert Hart, Manager.

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We have had your Exhaust Fan applied to eight cleaning mills and four grindstones at once. Where men could scarcely live before the air is now clear and healthful.
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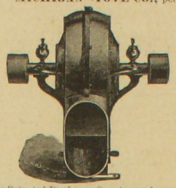

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Front View, showing Two Patented Discharge Openings, where all others have only One.

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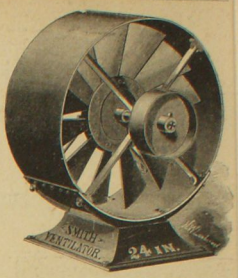

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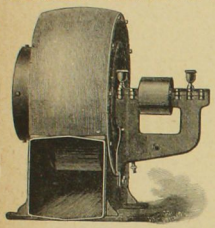

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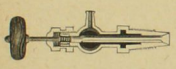

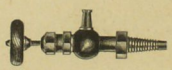

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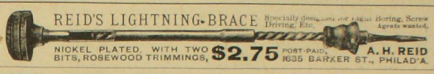

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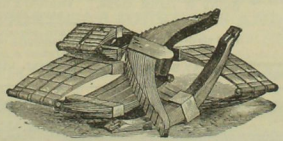

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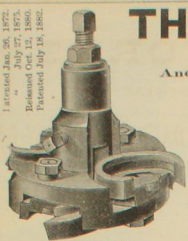

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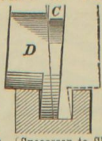

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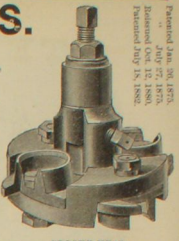

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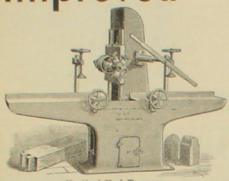

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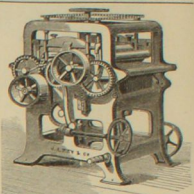

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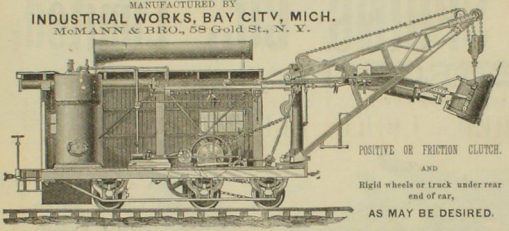

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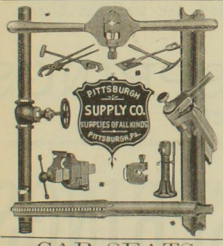

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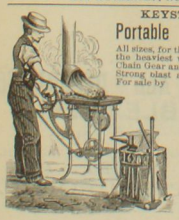

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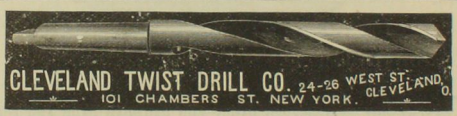

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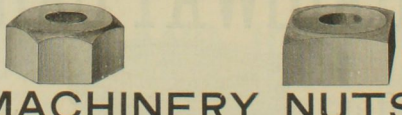

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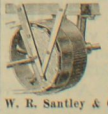

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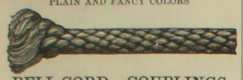

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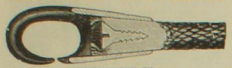

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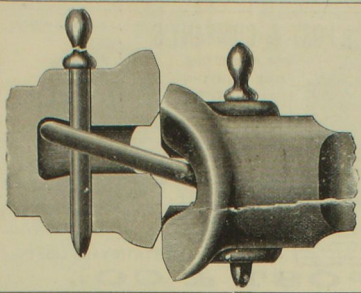

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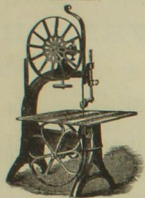

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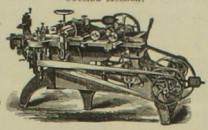

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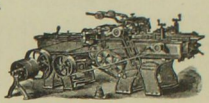

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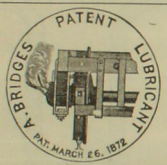

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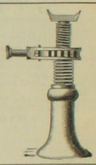

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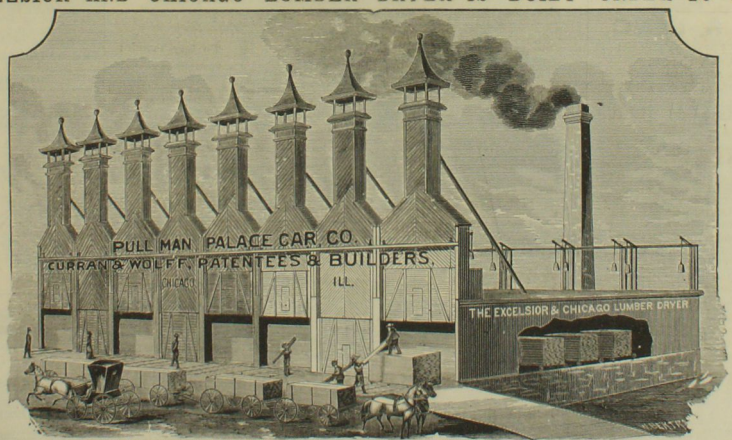

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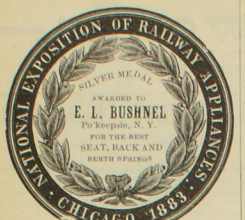

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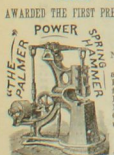

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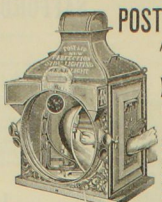

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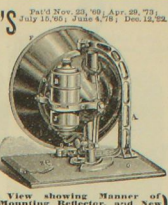

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This reservoir can be readily taken off. Send for Circular of

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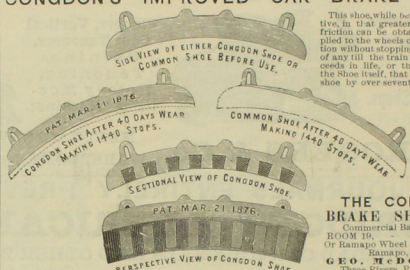

This shoe, while being more effective, in that greater uniformity of friction can be obtained when applied to the wheels of a train in motion without stopping the revolution of any till the train is at rest, exceeds in life, or the durability of the Shoe itself, that of the cast iron shoe by over seventy-five per cent.

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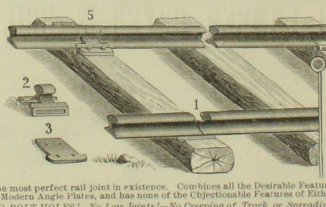

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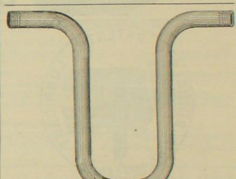

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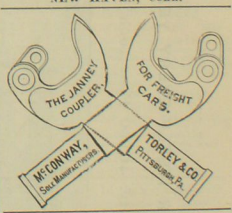

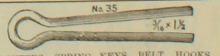

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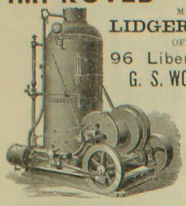

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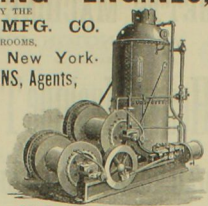

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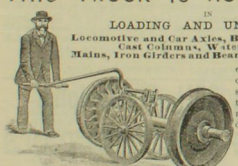

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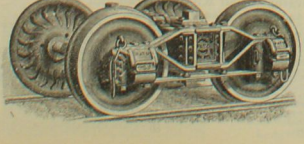

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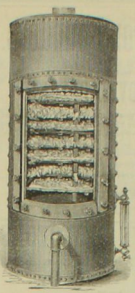

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Is the only lime-extracting Heater that will prevent scale in steam boilers, removing all impurities from the water before it enters the boiler.
Thoroughly tested.

OVER 3,000 OF THEM IN DAILY USE.

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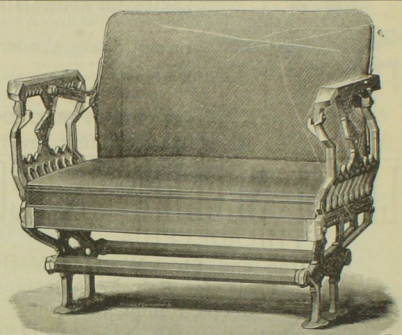

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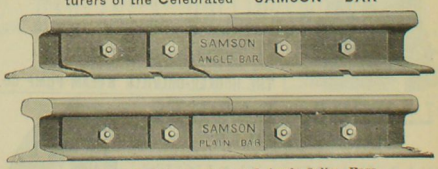

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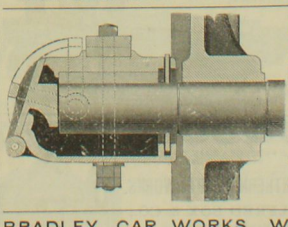

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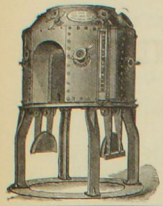

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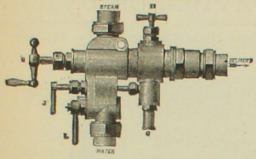

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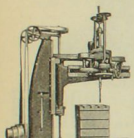

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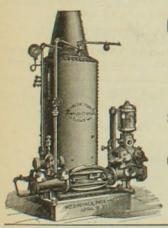

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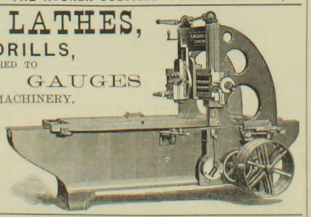

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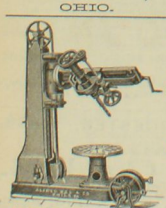

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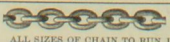

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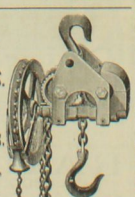

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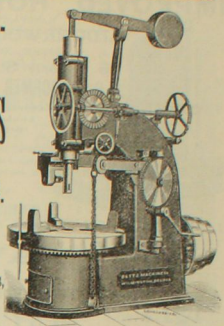

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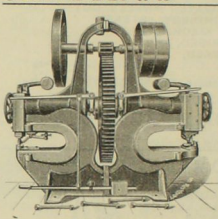

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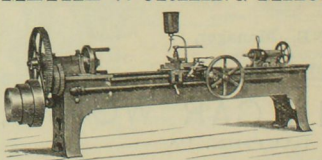

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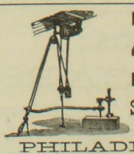

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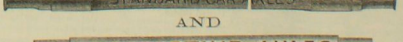

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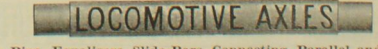

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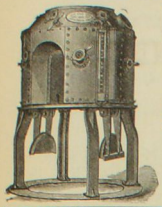

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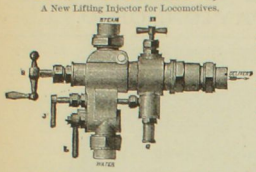

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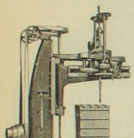

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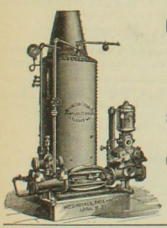

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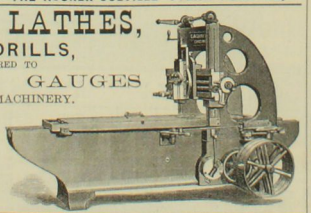

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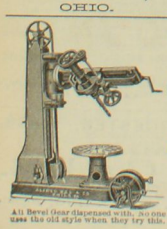

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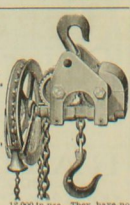

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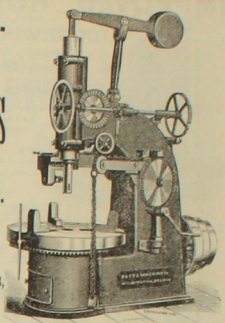

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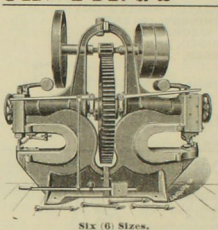

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WILMINGTON, DEL.

The annexed cut is the design of all sizes that are driven by belt power. When desired we place a small engine on the machine, the crank of which goes on where the pulleys are now shown. The punch and shear are entirely independent of each other, as they are each operated by a clutch, and the sliding-heads counterbalanced. For particular work the hand-wheel is used to set the punch to mark before throwing in the clutch.

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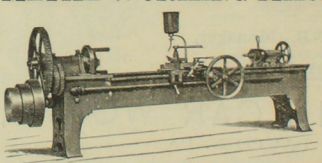

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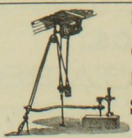

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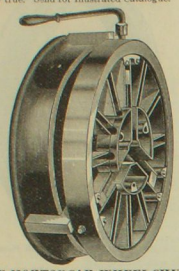

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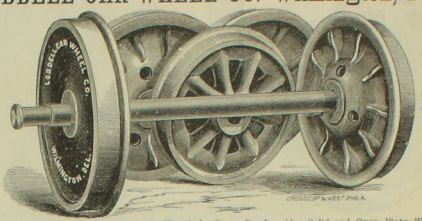

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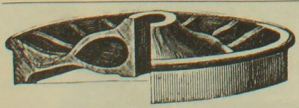

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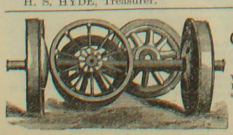

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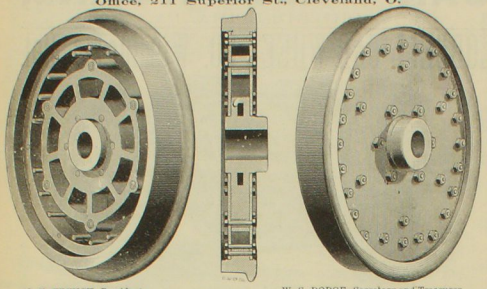

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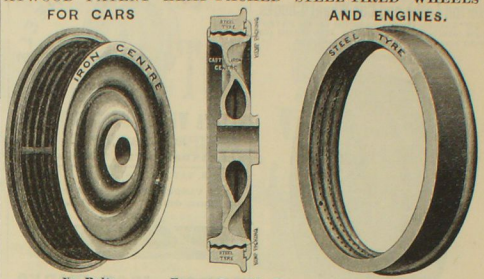

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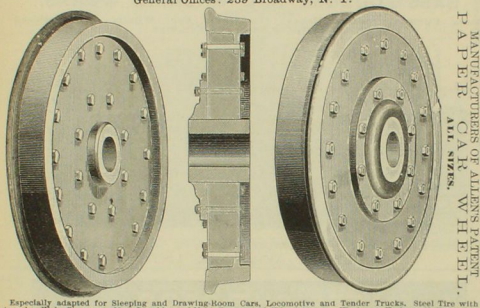

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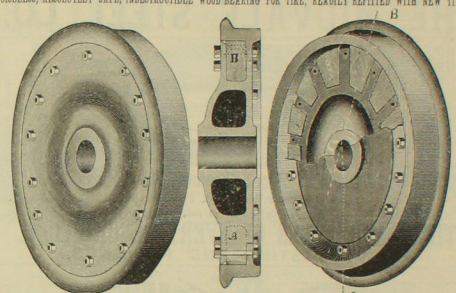

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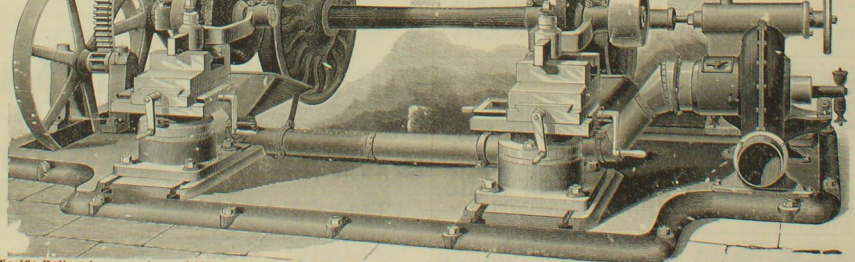

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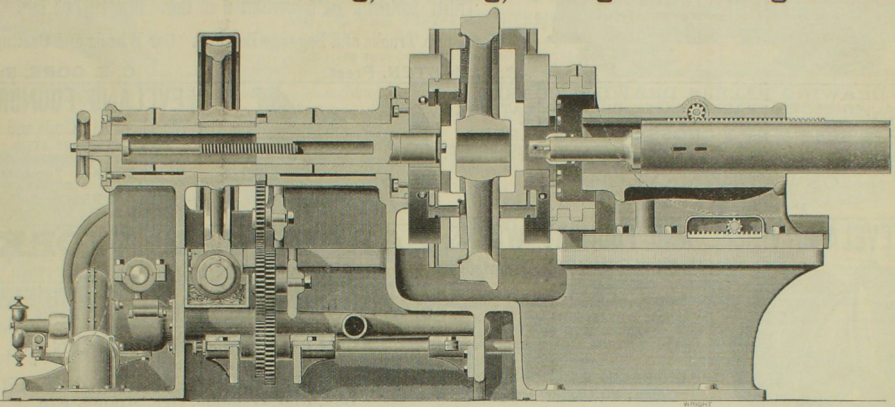

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It will centre any steel or steel-tired wheel by its already bored axle seat, turn the tread and flange in less time than any tool in existence.
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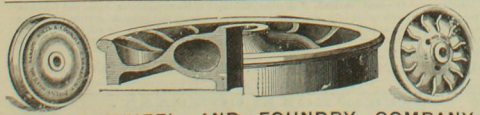

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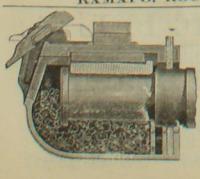

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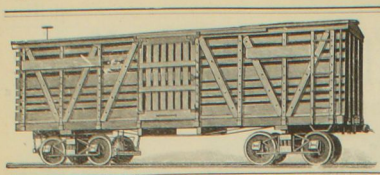

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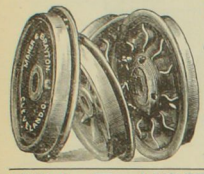

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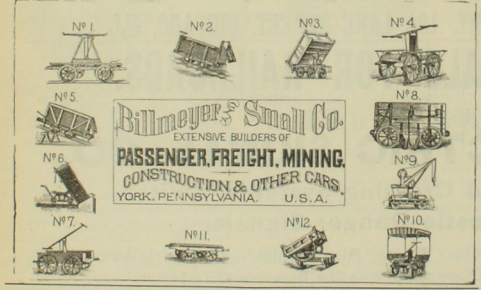

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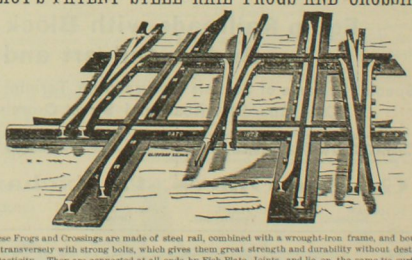

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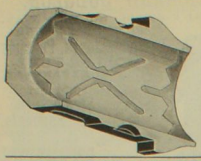

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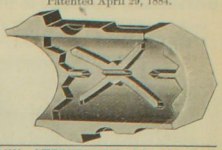

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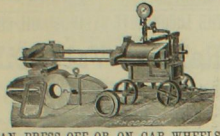

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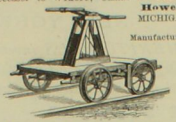

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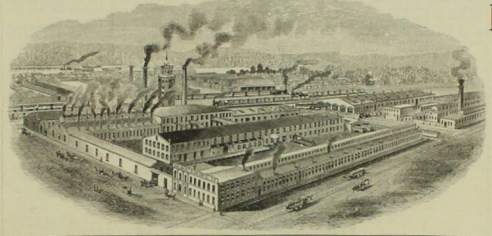

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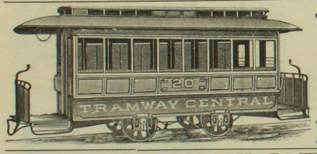

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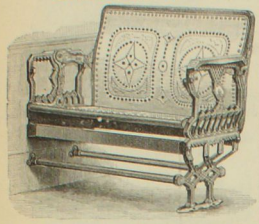

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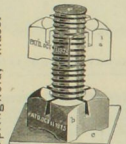

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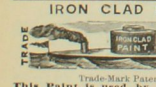

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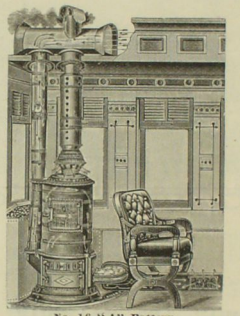

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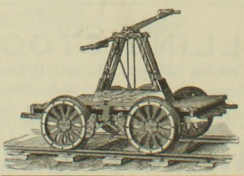

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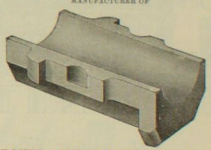

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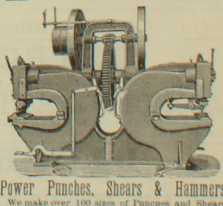

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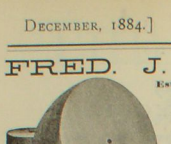

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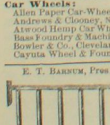

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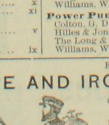

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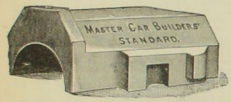

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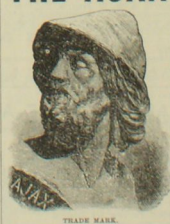

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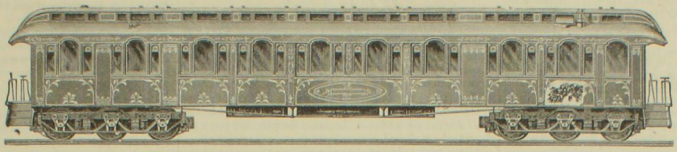

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VOLUME XV. NUMBER 12. | DECEMBER, 1884. | SINGLE NUMBERS, TEN CENTS. $1.00 PER ANNUM.

Miscellaneous Items.

THE Pullman Car Co., Pullman, Ill., are building 200 box cars for the Fitchburg road. They are to have French's springs, Pratt's doors and Marden's steel brake-beams.

MR. WILLIAM COULTER, one of the oldest railroad conductors in the country, died at his residence in Jersey City, Nov. 11, aged 64 years. Mr. Coulter began work on the New Jersey Railroad 44 years ago, running between Jersey City and New Brunswick, and has continued on the road ever since, his only change being the extension of his run to Philadelphia when the road was leased to the Pennsylvania.

THE Milton (Pa.) Car Works have an order from the Baltimore & Ohio road for 500 iron coal-hopper cars, of the same pattern illustrated in April CAR-BUILDER. Each car has three hoppers, nearly circular in plan, and forming the car body, which is without trucks, in the ordinary sense of the term. There are equalizing beams on each side, which form the truck sides. Those built by the road some time ago have proved so satisfactory that the present order has been issued. The cars of this construction are pushed in and out of the yards and around short curves as easily as those having trucks of the usual pattern, showing that the tractive force is apparently not greater than that of an 8-wheeled car.

THE Barney & Smith Mfg. Co. are building for the Hot Springs (Ark.) Railroad Co. some flat cars of 50,000 pounds capacity. They are 36 feet long and 8 feet wide, and are equipped with Finlay's central support truck and Westinghouse air brakes. After using a number of cars of this style of construction since April, 1883, the company find that they are a saving in dead weight and in the wear of rails and wheels, and have decided that all box and flat cars built for the road hereafter shall be of this kind. Their performance thus far has been closely watched by railroad men visiting the Springs, and who are of the opinion that cars with central support trucks will be the 60,000-pound cars of the future.

MR. J. AUGUSTUS DURGIN, who was recently appointed Superintendent of Motive Power of the New York, Providence & Boston road, was killed at Providence, R. I., Nov. 8, by being caught between two passenger cars while standing on the track. Mr. Durgin was 47 years old. He was born in New Hampshire and began life as a locomotive fireman at an early age. He worked his way up rapidly, and in 1868, when only 31 years of age, he had risen to the position of Superintendent of the Pittsburgh Locomotive Works, which he held for eight years, leaving it to become Agent and Superintendent of the Rhode Island Locomotive Works in Providence. There he remained until the summer of 1883, when he resigned and spent nearly a year in traveling, at first in Europe and afterward in Mexico. In August last he was appointed General Manager of the New York Locomotive Works, at Rome, N. Y., but resigned that position to accept the one he occupied at the time of his death. Mr. Durgin's ability as a locomotive builder and shop manager was shown by his conduct of the Pittsburgh and the Providence shops; as Agent of the Rhode Island Works he had a wide acquaintance among railroad men, and was successful in obtaining business, as well as in his management of the shops. He leaves a widow and two children.

MR. LEANDER GAREY has resigned his position as Superintendent of the Car Department of the New York Central & Hudson River road, to take effect Dec. 31 next. The office will then be discontinued, or rather merged with that of the Superintendent of Motive Power. Mr. Garey has been connected with the road a long time, having been for many years Master Car-Builder of the New York & Harlem before his appointment to his present position. He has been a leading member of the Master Car-Builders' Association since its first organization, and in 1874 was chosen President, a position for which he was peculiarly fitted no less from his personal qualities than from his large experience as a car-builder and thorough identification with the interests of the organization. That his duties as presiding officer have been acceptably performed, is attested by his having been rechosen for ten successive years. Previous to 1874, he was for a number of years Secretary of the Association. It is understood that after his resignation takes effect he will not engage in any active business for six months or a year, or until his plans for the future shall have been matured. Whatever these plans may be, it is to be hoped that the Association of which he has so long been the official head, will not be deprived of his experience and counsel.

THE Pennsylvania Steel Co. has had built to order an attractive new car 40 ft. in length and 10 ft. wide, designed by Mr. A. G. Cummings, Engineer of the signal and switch department. It was built at the Middletown Car Works and is painted a bright vermilion color on the exterior and lettered "Pennsylvania Steel Co., Frog, Switch & Signal Department, Interlocking Switch & Signal Apparatus." The interior is painted white. It has four compartments, and by moving the partitions toward the sides, the kitchen, dining room, machine shop, etc., can be thrown into one long room or work shop. It contains four double and four single berths, with wire mattresses on the side, and a table to accommodate 12 men is suspended from the ceiling out of the way, and can be let down and adjusted without delay. In the end intended for a machine shop there will be erected an engine of 1½ horse-power and lathes to suit. The outside of the bottom is filled up with receptacles for tools, material, etc. The car was taken to Hagerstown, Md., last week, for the purpose of erecting signals and interlocking switches for the Western Maryland and the Cumberland Valley Railroads. An awning can be adjusted on the outside of the car under which the mechanics can work in fair or mild weather.—*Steelton (Pa.) Reporter.*

THE Westinghouse Machine Co., of Pittsburgh, Pa., have issued a circular announcing that the sales of the Westinghouse engines have increased so as to require a manufacturing capacity of 100 engines, aggregating 3,500 horse-power, per month. This, in view of a further increase in the demand, has led to a reorganization of the business of the company, of which the following is an outline: The Westinghouse Machine Co., as such, will no longer solicit sales direct, its capital and energies hitherto employed in that direction having been concentrated entirely upon the manufacture. The selling department will be transferred to the following representative concerns: Fairbanks, Morse & Co., of Chicago, in connection with Fairbanks & Co. of St. Louis, for the Western States and Territories; Parke & Lacy, of San Francisco, Portland and Salt Lake City, for the Pacific Slope; and Imray, Hirsch & Kaeppel, of Sydney and Melbourne, for Australia and Oceanica. It is also announced that the trade heretofore controlled by the branch office of the company at 94 Liberty street, New York, is transferred to Westinghouse, Church, Kerr & Co., whose principal offices are at 17 Cortlandt street, the gentlemen composing this firm being recognized as officers of, or otherwise connected with, the parent company, but in this capacity operating as a distinct organization with an independent capital.

THAT cranked axles are not as strong nor as durable as straight axles is a matter of common knowledge in this country, where their use has practically been given up for many years. Abroad, there are great numbers of them in use in spite of their manifest disadvantages and positive danger. During the first half of the present year, 100 engine axles failed in Great Britain, and of these it appears that only 11 were straight while 89 were cranked. Of these, 59 were made of iron and 30 of steel. This is an apparently good showing for the steel, but as the total number of iron axles seems to be much larger than of steel, the figures do not convey much information. The average mileage of the iron and steel axles tells the story very clearly. Up to the time of breakage, 58 of the iron axles had made an average of 206,124 miles, while 27 steel axles had made but 166,687 miles. The difference is sufficient to justify the preference felt in this country for iron instead of steel. Almost every possible form seems to have had a trial, but the results with one style appear to be about as bad as with another. One of the latest accidents happened to an engine which had run but 50,776 miles since the axle which gave out was put in. The cylinders were of somewhat peculiar proportions, being 17 by 26 inches. The accident occurred on a passenger train, and much damage was done in spite of the fact that the engine was fitted with both outside and inside bearings.

SO common is it to remark that railroad men, especially train employés, are poorly paid, that we have taken the trouble to ascertain the average salary paid per month to the men in the different branches of train service, selecting July, which was the dullest month in the year with the Indianapolis railroads. The pay rolls of three different Indianapolis railroads—which are a fair criterion of other roads centering here—show that on one road the highest amount paid to any engineer was $117.25; the lowest, $97.35; on the second road, $103 the highest, $97 the lowest; on the third road, $108 the highest, $96.40 the lowest. All were paid on the trip, or mileage basis, as is the case with a majority of the roads of this country. The pay of the firemen ranged as follows: On road No. 1, highest $56.70, lowest $51.80; road No. 2, highest, $56.35, lowest $51.20; road No. 3, highest $52.65, lowest, $42.70. The ground is taken that firemen are practically apprentices. The brakemen were paid on road No. 1, the highest $56.80, the lowest $50.40; road No. 2, highest $56.70, lowest $50; road No. 3, highest $52.50, lowest $41.25. The pay of the conductors averaged as follows: road No. 1, highest paid conductor, $98.80, lowest $87.75; road No. 2, highest $97.50, lowest $86.10; road No. 3, highest $96.20, lowest $85.80. In every case trainmen, when business is heavy, can considerably increase their pay by making extra trips. Freight trainmen receive the largest pay per trip or mile, but are required to do more hours of service.—*Indianapolis Journal.*

AT the shops of the New York Central, at West Albany, Mr. Packard is making some important changes and improvements in the arrangement and fittings. The storerooms are being overhauled and enlarged and much new shelving is being put up. When the work is done, this department of the shops will be in a very convenient and satisfactory condition. New bins and shelving are being put up in the repair shops, which, like those in the storeroom, are all painted and numbered. The lettering indicates the article and its size, as well as any other information that may be needed. On the bins in the storeroom there are small frames large enough to hold a card. Upon this card is entered the quantity that is received, and when anything is given out it is also entered, so that to take an account of stock it is only necessary to foot up the two columns and subtract the smaller amount from the larger. Verification of stock can be made at any time, and may be done at leisure without interrupting the ordinary work of the department or throwing an unusual amount of labor on the storekeeper. In the paint shop a very radical departure from the common system has been introduced, which has already produced very valuable results, and which promises to do even more in the future. The work of mixing paint is all done in the store-room of the paint shop, and all supplies needed by the men are given out there. The feature which seems to have produced the best result was that of taking charge of all tools and giving them out as they are needed by the men. One side of the store-room is divided into bins large enough to contain a full set of painter's tools. These bins are all numbered consecutively from one upwards. At the side of the number is a small brass frame to hold a card on which there is a list of the various articles kept in that bin. In the morning, when the men come to work, they ask for what tools they require, and receive them from the storekeeper, giving in return a brass check with their roll number on it. This check is then hung up on a hook on the front of the bin, and forms their receipt for the tools. At the end of the day, when they have finished using the tools, they are returned to the tool room, where the storekeeper glances at the list on the card and sees instantly if all have been returned, and then hands back the check. This system is very simple, saves much time, causes the men less trouble than any other, and insures that every one is at work promptly. The loss and destruction of tools is very much reduced, and the men always have the articles which they require without delay. At the desk a record is kept showing every man's name and number, and the department of the shop to which he belongs. Although there is no building going on at the shops, they are very busy with repairs of all kinds. About 500 men are employed, who repair at the rate of 368 cars per day. During the month of September 9,516 cars were repaired at the shops. In the paint shop the work is going on with equal rapidity, as many as 60 cars going out in one month. They burn off cars at the rate of one in ten hours, with four men. This part of the work is arranged so day laborers can perform it. This makes a great saving in the expense for burning off.

Master Car-Builders' Association.

LIST OF SUBJECTS, WITH THE COMMITTEES APPOINTED TO REPORT THEREON AT THE ANNUAL CONVENTION TO BE HELD AT THE HYGEIA HOTEL, OLD POINT COMFORT, VA., BEGINNING TUESDAY, JUNE 9, 1885.

1. *A Standard Form for the Treads and Flanges of Wheels.*—The report of this Committee to include a recommendation of a maximum and minimum limit gauge for the flanges of wheels and cars received for interchange. H. Stanley Goodwin, Lehigh Valley Railroad, Bethlehem, Pa.; M. N. Forney, 73 Broadway, New York; R. C. Blackall, Delaware & Hudson Canal Company, Albany, New York; John W. Cloud, Pennsylvania Railroad, Altoona, Pa.; Herbert Wallis, Grand Trunk Railway, Montreal, Canada.

2. *Standard Freight-Car Trucks.*—Resolutions were adopted at the last Convention instructing the Committee to "present to the Convention in another year what they would recommend as a standard truck for cars of 40,000 pounds capacity and that a standard freight-car truck should be of the diamond form * * * and should have cross channels so that it may be used with a winging bolster or rigid bolster, * * * and that it is the sense of the meeting that a five-feet wheel-base would be accepted * * * and that the Master Car-Builders' journal is large enough for cars whose capacity does not exceed 40,000 pounds." The committee were also instructed to use the Master Car-Builders' standard journal bearing and journal box in the trucks for cars not exceeding 40,000 pounds capacity. Robert Miller, Michigan Central Railroad, Detroit, Mich.; Wm. McWood, Grand Trunk Railway, Montreal, Canada; Wm. Forsyth, Chicago, Burlington & Quincy Railroad, Aurora, Ill.; Joseph Wood, Pennsylvania Company, Ft. Wayne, Ind.; J. N. Barr, Chicago, Milwaukee & St. Paul Railroad, Milwaukee, Wis.; Henry S. Bryan, Chicago & Iowa Railroad, Aurora, Ill.

3. *Brake-Shoes, Brake-Beams and Interchangeable Parts of the Brake Arrangements of Cars.*—This Committee was continued, with instructions to submit a definite form of brake-shoe, brake-beam and of the interchangeable parts, for adoption at the next Annual Convention. L. Packard, New York Central & Hudson River Railroad, West Albany, N. Y.; John S. Lentz, Lehigh Valley Railroad, Packerton, Pa.; and J. W. Marden, Fitchburg Railroad, Boston, Mass.

4. *Standard House-Car to carry 60,000 Pounds of Lading.*—The Committee on this subject was continued and was united with the Committee on Freight-Car Framing and Trussing, with instructions to report on a definite form of framing and trussing, for adoption at the next Annual Convention. H. Stanley Goodwin, Lehigh Valley Railroad, Bethlehem, Pa.; John W. Cloud, Pennsylvania Railroad, Altoona, Pa.; Leander Garey, New York Central & Hudson River Railroad, Grand Central Depot, New York; F. M. Wilder, New York, Lake Erie & Western Railroad, Susquehanna, Pa.; L. Packard, New York Central & Hudson River Railroad, West Albany, N. Y.; Wm. McWood, Grand Trunk Railway, Montreal, Canada; R. McKenna, Delaware Lackawanna & Western Railroad, Scranton, Pa.; R. H. Soule, New York, West Shore & Buffalo Railroad, Frankfort, N. Y.

5. *Standards and Appliances for the Safety of Trainmen.*—This Committee was appointed in accordance with the following resolution:

Resolved, That a committee be appointed to prepare a circular calling the attention of railroad managers to the standards and the appliances for the safety of trainmen, which have been recommended by this Association, and that this committee be urged to do everything in their power to secure their adoption.

John Kirby, Lake Shore & Michigan Southern Railroad, Cleveland, O.; B. K. Verbryck, Chicago, Rock Island & Pacific Railroad, Chicago, Ill.

6. *Passenger-Car Framing and Trussing.*—Thomas A. Bissell, Barney & Smith Manufacturing Company, Dayton, O.; William Forsyth, Chicago, Burlington & Quincy Railroad; and Robert Miller, Michigan Central Railroad.

7. *Automatic Freight-Car Brakes.*—Godfrey W. Rhodes, Chicago, Burlington & Quincy Railroad, Aurora, Ill.; George Hackney, Atchison, Topeka & Santa Fé Railroad, Topeka, Kansas; B. Welch, Central Pacific Railroad, Sacramento, Cal.

8. *Freight-Car Roofs.*—F. M. Wilder, New York, Lake Erie & Western Railroad, Susquehanna, Pa.; R. C. Blackall, Delaware & Hudson Canal Co., Albany, N. Y.; and D. Holt, Gilbert Car Manufacturing Co., Troy, N. Y.

9. *Trap-Doors in the Roofs of Passenger Cars.*—This Committee was continued and was requested to furnish plans at the next Annual Convention. F. D. Adams, Boston & Albany Railroad, Allston, Mass.; John Mackenzie, New York, Chicago & St. Louis Railroad, Cleveland, O.; Sanford Keeler, Flint & Pere Marquette, East Saginaw, Mich.

10. *Side-Dumping and Drop-Bottom Coal Cars.*—Joseph Townsend, Chicago & Alton Railroad, Bloomington, Ill.; John Hodge, Missouri Pacific Railroad, St. Louis, Mo.; and C. E. Gore, Lafayette Car Works, Lafayette, Ind.

11. *Standard Dead-Blocks.*—This Committee to submit detailed drawings of dead-blocks to be adopted as standards by the Association. Charles Blackwell, Norfolk & Western Railroad, Roanoke, Va.; George W. Demarest, Northern Central Railroad, Baltimore, Md.; M. N. Forney, 73 Broadway, New York.

12. *The Comparative Advantages of the two Methods of Constructing Freight Cars, with and without Platform Timbers or End Sills Projecting from the End of the Car.*—E. B. Wall, Pittsburgh, Cincinnati & St. Louis Railroad, Columbus, Ohio; B. K. Verbryck, Chicago, Rock Island & Pacific Railroad, Chicago, Ill.; Geo. W. Cushing, Northern Pacific Railroad, St. Paul, Minn.

13. *Subjects to be Reported at the next Annual Convention for Investigation and Discussion of the Succeeding Convention.*—R. H. Soule, New York, West Shore & Buffalo Railroad, Frankfort, N. Y.; Sanford Keeler, Flint & Pere Marquette Railroad, East Saginaw, Mich.; James N. Lauder, Old Colony Railroad, Boston, Mass.

14. *Committee of Arrangements for the next Annual Convention.*—M. M. Pendleton, Seaboard & Roanoke Railroad, Portsmouth, Va.; J. W. Fleming, Petersburg Railroad, Petersburg, Va.; John S. Whitworth, Norfolk Southern Railroad, Norfolk, Va.

Determining the Position of Eccentrics.

BY FRANK C. SMITH.

It is not infrequently desirable to key eccentrics on to the shaft before the wheels go under the engine, and when this is the case no little scheming is necessary to determine the correct position. In fact, the wrong position is more frequently found than the right one, resulting in the use of a "dutchman," or offset key, after the wheels are in place.

There are a few roads in this country building engines so closely to templet that the keyways are planed in the shaft for the eccentrics at the same time the keyways for the wheel are planed, but such roads are the exception.

If the center line of the cylinder cuts the center of the shaft, or overshoots it one or two inches, as is sometimes the case to allow the use of large cylinders and not necessitate the use of too small a truck wheel, this fact must be known, and the normal position of the driving box in the jaws determined, from which the center of the shaft respecting the balance of the gear is laid down. It appears to give the best results to lay down the necessary points full size on a flat, smooth floor, as the possibility of error is much less. A center line, *r r*, is first drawn, representing the center line of the cylinder extended back past the shaft's position. A circle *x*, the size of the shaft where the eccentrics are to be keyed, is then to be drawn on the center line if the center line of the cylinder cuts it, or below the center line if the latter overshoots it. The upper rocker-arm *s* must be adjusted square to the valve-stem, which brings the lower rocker arm into its proper position. No attention is paid to the position of the valve itself. The distance the lower rocker-arm pin is above or below the center line of the cylinder must be ascertained. This is easily done by passing a straight-edge accross the top of the frames, from the lower edge of which straight-edge the distance to the center line of the cylinder may be measured as well as to the center of the lower rocker-arm pin. The position of the pin may then be laid down on the floor as at *g*. The position of the center of the shaft in the jaws being laid down on a piece of wood placed between the jaws, the distance from the center of the shaft to the center of the lower rocker pin as *g o* is laid down on the floor. Having determined and laid down on the floor the proper position of the shaft center *o* and rocker-armpin *p*, a pair of trams are set in these points on the floor and the dotted line *g m* drawn, cutting the circle *p*, which represents the path the

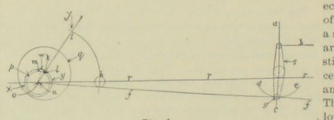


Fig. 1.

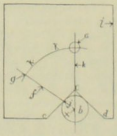


Fig. 2.

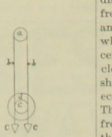


Fig. 3.

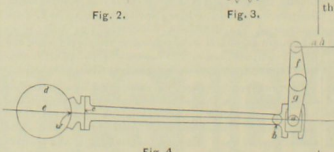


Fig. 4.

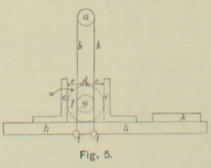


Fig. 5.

centers of the eccentrics travel in at *m*. The lap and lead being known, it is laid off from the center of the axle *o* toward the crank-pin *h*, which is drawn in a position representing the engine on the forward center. The lap and lead *o n* is then taken in a pair of compasses and laid off from the dotted line *o m* establishing the point *l* on the circle *p*. From the center *l* the circle *q*, equal in diameter to the eccentric, may be drawn. Through the center of axle *o* and the center of eccentric *l*, a line *o l i* is drawn, the angle between which and the line from the center of the shaft to the crank pin *h*, it was necessary to find. If it is convenient (as is not always the case) the wheels may be placed in the lathe, a scriber fastened into the tool-post and adjusted to touch the crank-pin center (which should be in a horizontal position relative to axle center); the scriber point, by adjusting the lathe carriage, may then be brought to the eccentric seat on the axle and the point *y* determined by this means. If this plan should not be convenient, a board *S*, Fig. 2, having a straight and true edge *i*, may have a line *c h* drawn on it true and parallel to the edge *i*. On this line a circle equal to the shaft at the eccentric seat may be drawn on this line as at *b* from the center *x*. From *x* the position of the crank pin *a* (equal to the throw) may be located. From the points laid down on the floor, the distance from the center of the crank pin *h*, Fig. 1, to the point *f*, may be taken in a pair of compasses and laid off on the crank pin circle on the board, Fig. 2, establishing the point *g*. Through *g* and the center *x* draw the line *f*. The *V*, *e e d* may then be carefully and accurately cut out of the board, being careful that its edges just cut the circle *b* and are square to the face of the board.

The wheels may then be adjusted so that the crank pin *a*, Fig. 3, is perpendicular over the shaft *d*. This is done by *d* awing on the end of the shaft a circle *c*, equal in diameter to the collar of the crank pin, next to the crank pin hub. A line *b b* with a weight at each end, as at *x e*, is then thrown over the pin collar, and the wheels adjusted until the lines just coincide with the circle *c*. In this position the wheels are to be blocked. The board *S*, Fig. 2, is to be placed with the *V*, *e e d* on the eccentric seat on the shaft, and the edge *i* brought perpendicularly, by hanging a line and weight or plumb bob over the top of the board and extending down the edge *i*. When this is accomplished, the intersection of the line *f* with the shaft indicates the center of the keyway; the keyway in the eccentric being cut centrally with the same line *o l k i* in Fig. 1 at the point *k*. If it is not desired to use the board, the pin may be plummed over the shaft as in Fig. 5, a straightedge, *h h*, leveled by level *k* under the shaft and supported in that position. Two squares, *e e*, are placed as shown touching the shaft *f*. A point *d* midway between the squares, *e e*, is located. From this point, with the distance *y k*, Fig. 1, in a pair of compasses, the point *w*, Fig. 5, is laid down, which is the center of the keyway to be cut. The same process finds the position for the other eccentric.

It frequently saves considerable time in putting up new eccentric rods, to be able to determine exactly the length of the rod. This is easily and correctly done by the aid of a smooth floor or board. In Fig. 4, place the upper rocker-arm, *f*, square to the valve stem *h h*. Take the distance on a stick from the center of the lower rocker-pin, *a*, to the eccentric seat on the shaft. Caliper the shaft at this point and add one half of its diameter to the length on the stick. This gives the distance from the center of the shaft to the lower rocker-pin when the latter is at its mid or central position. Add the distance *a b* to the distance *c w*, which distances are of course obtained by measurement direct from the rocker-arm and link, and the eccentric strap-butt and eccentric, and to these distances add the distance *e w*, which is one half the diameter of the eccentric. As the center of the eccentric is usually within the shaft, that is, closer to the center of the shaft than the outside of the shaft, it is necessary to get the distance *e w* to caliper the eccentric and take one-half of this for the distance *e w*. The sum of the distances *a*, *c w* and *e w* is to be subtracted from the length obtained on the stick. The remainder is the length of the eccentric.

Locomotive Economy.

BY FRANK C. SMITH.

The question, how can better economy be attained in the locomotive department, is one that many master-mechanics have asked themselves, and while it is not the purpose of this communication to lay down any cast-iron rules on the subject, as the writer is well aware that that which results in economy on one road does not always produce the same results on others, it is the purpose of this communication to set forth how excellent economy was attained a few years back on one of the large roads of this country. Leaving this portion of the subject to return to it later on, in order to better illustrate the methods which resulted so successfully I will ask a question which has bothered many good master mechanics. On many roads, eight-wheel engines are used in both freight and passenger service. These engines are very frequently the same size, 16 or 17 by 24-inch cylinders, and the same grate surface. The freight engine is loaded heavily and runs at slow speed, the passenger engine is comparatively loaded lightly, and runs at a much higher speed. The amount of air brought into contact with the coal on the grate of the freight engine is such an amount as is due to about 500 exhausts per minute, while the passenger engine makes from 1,200 to 1,500 exhausts per minute. The freight engine's exhausts are, it is true, heavier than the passenger engine's, but their velocity is much less. The amount of air brought into contact with coal while in a state of combustion has a very great influence on the amount of heat given out, or the economy of the engine. The area of the grate being the same in both engines, which engine, the freight or passenger, is

subjected to conditions which are the best suited for economy? Would a larger grate (which is impossible) effect better economy, or would a smaller grate, and if the smaller grate, in which engine should it be applied?

To settle this point, the writer made some experiments on several 16" × 24" passenger accommodation engines some time ago, and found that the smaller the grate the better the economy up to a point where the grate was too small to burn the necessary amount of coal. The number of these accommodation engines was eleven, and the first step toward better economy was the adjusting of the grate surface. Unfortunately, I have not full data relating to all of the points involved in the changes, but the adapting the size of the grate to each engine resulted in very material economy, and it is remarkable that although the engines were practically counterparts of each other, it was seldom that the area of grate giving the best economy was the same in any two of the engines, although the speed, weight of trains and number of stops were practically the same. Several years ago, the writer was firing an engine that had the best fuel record on the road. A test engine with an improved boiler was brought from the East, to prove to the officials of that road the saving that could be effected by adopting the boiler for all engines. The best engineer on the road was wanted to run the new engine, and the writer's engineer was selected. After a month's trial, during which all necessary data were carefully kept to show the full performance of the engine, it was found that no such record for economy had been attained by any engine on the road. During the month the writer's engineer ran the new engine, he was constantly under the supervision of a gentleman interested in the engine, and very frequently had the road's superintendent and master mechanic aboard. He was thus constantly urged to his best. On returning to the writer's engine, the engineer, so accustomed to watch every point for economy by his month's experience on the new engine, unconsciously, perhaps, kept up his economical practice, with the result of making a better record on fuel by some 5 per cent. than the new engine had made. It therefore appears that better economy can be obtained where the engineer is constantly prodded *somehow* to do his best. To accomplish this, the engineers of the eleven engines mentioned received each month at the round-house a slip of paper showing the results of their month's work. On the margin of the slip the words "first-class," "good," "bad," "very bad," were written in ink as the report showed. When an engineer received three slips marked "bad" and two marked "very bad" in succession, unless he could show good cause, he received a suspension of thirty days. The form of slip was as follows:

X., Y. & Z. R. R. CO.

PODUNK, June 25, 1882.

S. D. Renchrod, Engineer.

Engine No. *119*, operated by you during the month of *May*, 1882, made *4,450* miles. Average and expenses were as follows:

Average No. Miles of Engine Miles Run.	Your Average.	General Average.
To 1 pint lubricating oil	12.72	18.27
" 1 ton of coal	26.5	42.01
Cost per engine miles in cents.		
For Repairs	.97	2.48
" Stores	.75	.52
" Fuel	9.05	5.20
" Engineers, Firemen and Wipers	7.05	5.78
Total cost per mile	17.80	13.78
Average No. Cars hauled per train. Passenger	4.7	4.8
Average No. Cars hauled per train. Freight		
No. cars hauled one mile to one ton of coal. Passenger	.97	1.53
No. Cars hauled one mile to one ton of coal. Freight		
Cost per Car per mile hauled. Passenger	3.05	3.11
Cost per Car per mile hauled. Freight		

Remarks: *Bad.*

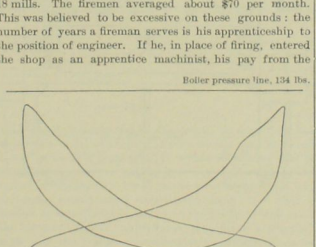
Duplicates of these Notices are kept in the Master Mechanic's office. Engineers making the best averages will have the preference in promotion.

Wm. F. Vigilant, Master Mechanic.

The result of this was another marked improvement. A "traveling engineer," that is, one who was known to be a first-class man, was put into service, and his duties consisted in riding on first one engine and then another, instructing engineers and firemen when necessary. The results did not show up well, and he was relieved. The division master mechanic then devoted a week each month to the duties performed by the traveling engineer, with better results, perhaps, because his authority was more fully recognized and appreciated.

Several home-made shop tools and devices for cheapening repair work were introduced with good results. A balance valve lessened greatly the expense of keeping valve seats in order, and the cylinder packing (a patent) which had been costing some $18 per year per engine was changed for two plain cast-iron rings, which averaged about $5 per year per engine. A short extension smoke arch was then added, which allowed of increasing the exhaust nozzles ¼ of an inch. The cut shows a pair of cards taken from the engine after this change. Unfortunately I have not with me the cards taken before this change, but I remember that the back pressure was some five pounds more than the amount shown. A brick arch hung on pipes was added to the fire-box, which with the enlarged nozzles showed a very good gain in economy. The amount of economy due to the brick arch was quite small, however, the real advantage being its smoke preventing qualities in connection with a perforated door and damper arrangement. The action of the arch appeared to be that it absorbed the heat from the fire when the latter gave off no smoke, the face of the arch becoming white hot. When a fresh fire of green coal was thrown into the fire-box, the gases given off which would have resulted in smoke without the arch, were ignited while passing over its white hot face. The result was, after a fresh fire had been added, a thin gray smoke, through which objects could be plainly seen, extending between two and three telegraph poles, when it entirely disappeared until the next fire was thrown in. It was found that many engineers were in the habit of putting their engines, after a run, onto the table with an insufficient amount of water, which resulted frequently from leaks, blowing-off, etc., in the engine, not having enough water to fire up on in case (as frequently occurred) the engine was wanted before she was entirely cold. This necessitated the raising of the safety-valve lever to blow off the steam, so that the extra water could be run in. This practice, before it was stopped, made a very appreciable increase of repairs on flues, etc.

A premium system was put into practice and gave very satisfactory results. The best coal record of an engine of a given class was taken as the standard. Coal cost on the tenders $1.50 per ton. For each ton of coal saved over the standard the engineer received 20 cents and the fireman 15, the road saving the difference—$1.15 per ton. It was doubted if this scheme would result in any saving, as it was believed that the threat conveyed in the monthly slips, and the "lay offs" delinquent engineers received, had given the best economy, but the result showed that many engineers who could do better, merely did well enough to escape being "laid off," and did much better when bribed. The premium system was a success. The wear of tires was also found to be susceptible of being lessened. Some engineers were making 90,000 and 100,000 miles between turnings, and others as low as 30,000. This had been laid to the tires, and to determine this engineers making the large mileages between turnings were changed to the engines on which small mileages had been made, the engineers of the latter being placed in charge of those engines making large mileages, when it was found that the mileages between turnings was due to the engineer, and those making as low as 30,000 miles between turnings were relieved of further duty. The engineers were receiving 35 mills per mile, and the firemen 18 mills. The firemen averaged about $70 per month. This was believed to be excessive on these grounds: the number of years a fireman serves is his apprenticeship to the position of engineer. If he, in place of firing, entered the shop as an apprentice machinist, his pay from the



Cut off at 5"; Revolutions, 270; Speed of Engine, 57 Miles per hour; Cylinder, 16 by 24".

time he entered till he became a journeyman would not average over $1.30 per day. Why, then, should he receive more pay while in his apprenticeship than the average journeyman machinist does? Whether justly or not, it was arranged that a fireman's pay should be $40 per month, 3,000 miles constituting a month, his apprenticeship covering four years, at the expiration of which he was examined for the position of engineer, which, if he passed, and there was no opening for his promotion, his pay was advanced to 19 mills per mile, which he received until he took charge of an engine as an engineer. Following is a portion of the performance sheet showing the cost of these eleven engines before the several changes explained took place (column 1) and afterwards (column 2):

COST OF COAL PER TON ON TENDER, $1.50.

	Col. 1.	Col. 2.
Average coal used per mile	50 lbs.	27 lbs.
Cost per mile run for coal	.0375 cts.	.02025 cts.
Oil, tallow, waste	.0030 cts.	.0021 cts.
Repairs	.0411 cts.	.0285 cts.
Engineers, firemen, wipers	.0692 cts.	.0501 cts.
Total cost per mile	.1514 cts.	.10045 cts.

Average number of cars hauled per train, 4.24.

The reduction of coal from 50 to 27 pounds per mile will attract notice, and, although this appears unprecedented for an average, two of the eleven engines had individual averages of 22 pounds per mile. The reduction in oil was largely due to the use of a better class of cups, which were used on every possible oil-hole. Without good cups and a sufficient number of them the amount of oil wasted in "oiling around" would supply the engine. The saving in repairs was largely due to home-made shop rigs and devices and personal attention of the Division Master Mechanic in riding on engines, etc. The reduction in wages was the result of considering the fireman as an apprentice, and paying him accordingly. During the year in which this record was made, three engines, I think, had a general overhauling which was charged against them and enter into this general average, and therefore the average is not an average of running expenses for a single year, but is duplicated year after year.

On many roads it is customary when an engine receives damages in a collision, derailment, etc., out on the road, to charge such repairs to the transportation department, and such repairs never appear as charged to the engine or locomotive service. This was not the practice on the road in question, and I believe none of the eleven engines suffered from any accident during the year. If they had the average would have been increased.

Railroad Law.

Trespasser on Track.—The right of a railroad company to use its track is exclusive of the public, except where they have the right to cross it, or where its use in a reckless or improper way must necessarily endanger the lives of those whose proximity to the road requires the exercise of care and caution by those running railroad trains. In passing through cities, towns or places where persons congregate, greater care and caution must be exercised than on that portion of the road where human beings have no right or license to travel. The speed at which the train is propelled in such a case can not be said to be willful neglect on the part of the company as to one who voluntarily places himself on the track and is injured by reason of his own carelessness. To adjudge otherwise would be to convert the track of the railway into a public road for the use of all who may choose to go upon it. Rules and regulations adopted by a railroad company for the protection of its passengers and trains do not apply to trespassers on its road, whose own wrongful and negligent conduct places them in danger, and the only obligation or duty on the part of the company or its employés in such a case is, when made aware of the danger, to avoid inflicting any injury if, by the exercise of ordinary diligence, they can prevent it.—*Kentucky Court of Appeals, Sept.* 4, 1884.

Where an adult person, in full possession of mind and senses, for his own convenience, walks upon a railway track, away from a crossing, where he has no right to be, while it would be the duty of persons operating trains if they saw him and could avoid injuring him, to do so, if they did not see him and were ignorant of his dangerous position, they would not be bound to look out to save him from injury; and in the event of injury, he would not be entitled to recover, and the jury should be so instructed.—*Supreme Court, Iowa. Sept.* 19, 1884.

Carrier's Liability.—The Texas Court of Appeals lays down the following rules: 1. Where a carrier fails to deliver goods within a reasonable time, such failure will not of itself amount to a conversion, but only a breach of contract, and the owner cannot refuse to receive them. 2. Where the case is one of total failure to deliver a part of the goods, the shipper can refuse to receive the remaining damaged goods upon any terms, and can recover the value of the whole. 3. The undertaking to transport goods to a particular place, includes the duty to deliver them safely, and the carrier's responsibility continues until a due delivery has been made.

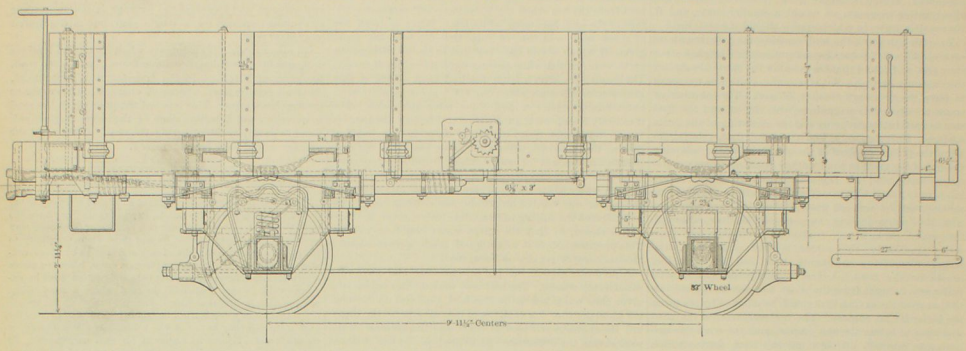
Carrying of Passengers.—A railway carrier of passengers is bound to use every reasonable means to keep in a safe condition all portions of its station platforms and approaches thereto, to which passengers or those who have purchased tickets, with a view of taking passage on its cars, would naturally or ordinarily be likely to go. This includes the duty of properly lighting at night their depots and approaches to and from the trains.—*Supreme Court, Minnesota, Aug.* 21, 1884.

Elevated Roads and Spark Arresters.—A street-car driver sued the Manhattan Elevated Railway Co., New York, for damages sustained from cinders falling from locomotive. There was evidence that the defendant failed to adopt and use the most approved methods for preventing the escape of sparks and cinders. Held: That it is the duty particularly of elevated roads under which vehicles, surface cars and pedestrians constantly pass and repass to use every appliance which will prevent the emission of sparks, cinders, or anything calculated to do damage to those underneath. Judgment for plaintiff.—*City Court, New York, Oct.* 24, 1884.

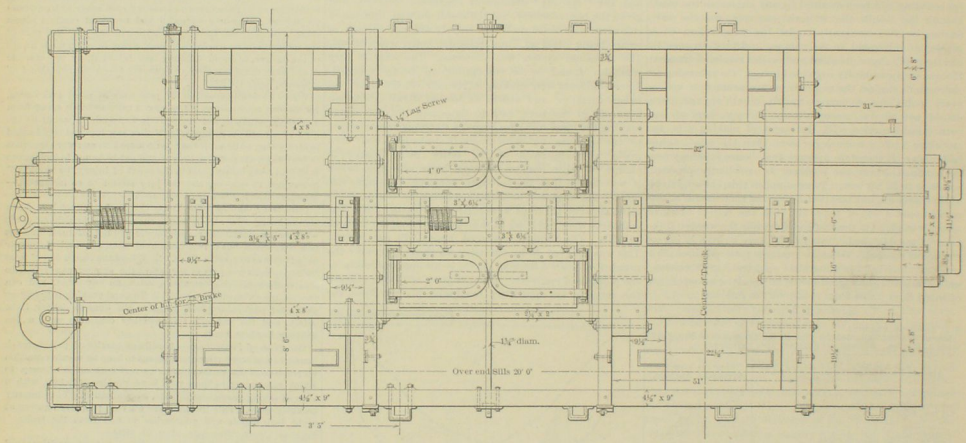
Master and Servant—Contract of Service.—A written agreement to serve in the employment of a railway company, if signed by the person entering such service, although not actually signed by the company, is still evidence of the agreement.—*Supreme Court, Pennsylvania*, 1884.

THE Schenectady Locomotive Works have recently completed ten freight locomotives for the Wisconsin Central road. They are American type, with 17 × 24" cylinders and four-coupled eight wheels. Also two freight engines for the Scioto Valley road, with 17 × 24" cylinders, and the works have in hand two ten wheel, 18 × 24" cylinder, and two switching engines for the Cincinnati, Indianapolis, St. Louis & Chicago road. The works employ about 500 men, and among other improvements, a new and independent water supply has been obtained from the Mohawk River, on the bank of which a pump house has been erected and a 10-inch main laid from it to the works. The main pump is a Worthington compound with a 10 × 10" water cylinder. The high-pressure cylinder is 8¼" and the low-pressure 16" in diameter. In addition, and as a reserve, there is a 12 × 17" Davidson pump. The suction pipe, which is 10" in diameter, is carried 28" below low water mark. The branches from the main are 6" diameter in the yard and 3" in the buildings. The steam is furnished by two vertical tubular boilers, 48" in diameter at the smallest ring, 60" at the fire box, and 14' 9" high. The fire box is circular, and is 52½" in diameter and 39" deep. There are 151 tubes 2¼" and 11' 6" long, tube sheets ½" thick. These boilers are of Otis steel throughout and burn at the rate of about six tons of bituminous coal in two weeks.

FOUR-WHEEL GONDOLA CAR—DELAWARE & HUDSON CANAL CO.



Side Elevation.



Plan.

Each pair of wheels in this car are held in jaws set on a rectangular frame, which resembles that of an ordinary four wheel truck. There are springs over the journals and half elliptics on the body, which carry the side bearings. This arrangement makes an elastic connection between the truck and body, making the car much easier than it would be if the pedestals were bolted upon the sills. The trucks, which are without king bolts, are held rigidly between two cross timbers or needle beams. This makes them rigid in curving, but as the wheel base is only 9' 11", or but little more than that of a long six wheel truck, this is not material.

These cars have the Hoit continuous draw bar, and in service have been giving great satisfaction. Mr. Blackall, the Superintendent of Machinery of the road, considers them very useful aids in handling a local coal or other similar traffic. The framing is similar in all important particulars to that used by Mr. Blackall in his gondola coal cars.

The Tehuantepec Ship Railway.

During the past month a working model of Capt. Eads' ship railway across the Tehuantepec Isthmus has been on exhibition in New York. The project is such an extraordinary one, that great interest has been felt in the demonstration of its feasibility as furnished by the operation of the model, the construction of which is very elaborate, and is said to have cost $10,000. It was made by the famous firm of Holtzapfel, of London. Its total length is about 30 feet. It represents the dock which the ship enters from the sea, the hydraulic lifting apparatus by which she is lifted with the cradle to the level of the rails, a length of the railway, one of the hydraulic turn-tables, and a six-foot model of a ship made to scale and representing a vessel of say 5,000 tons burden. The miniature ship floats in an outer or receiving dock till she is ready to be taken into the inner dock over the lifting pontoon and raised to the level of the track precisely as a full-rigged ship would be. So far as the machinery is concerned, she is handled like a full-sized vessel.

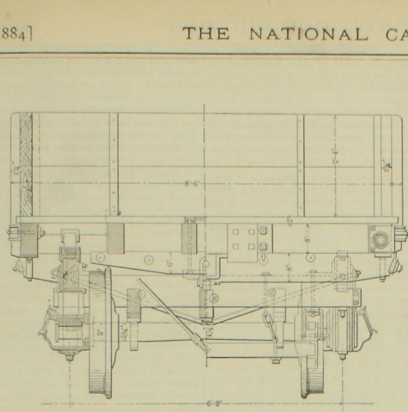
The pontoon or floating dock on which the ship is lifted from the water will be 450 feet long, 15 feet deep and 75 feet wide. It works in a basin or dock, opening into the outer dock, which receives the vessel from the sea. The pontoon is so held that its movements are all vertical, and it has 20 or 30 vertical stay-rods on each side to prevent it from lifting above the rail level when the weight of the ship is partially or entirely taken off.

The pontoon has three lines of rails of the standard gauge laid upon its deck. On these rails the car on which the ship is to be moved rests, and sinks into the water with the pontoon to receive the ship. After the cradle has been run on to the deck of the pontoon and submerged by opening the sluice valves, the ship is floated into position over the cradle and the pumps set at work to empty the pontoon and cause it to float, th s raising the vessel. On each side of the pontoon, and forming a part of it, there are two rectangular towers, the tops of which are above the water when the pontoon is sunk. In the towers is all the hydraulic apparatus necessary to control the machinery of the pontoon and the pumps. The cradle on which the ship is transported, and on which she is held as she rises from the water, is an enormous transfer-table. It is supported on some 360 double-flanged wheels with independent axles. These wheels are arranged in pairs so as to form a sort of diamond truck having two springs and a pair of arch-bars. Each truck has four journals, as usual. The two springs are to be of 20 tons capacity and have a range of 5 inches. There are 12 cross girders in the cradle, and each one of these is expected to carry 100 tons, which would throw a weight of about 8½ tons on each wheel. The springs are expected to perform the part of equalizers and distribute the weight properly. The ship is supported on the cradle by a great number of bilge and keel blocks. These are rectangular blocks hinged on the top of long screws which go loosely through the girders.

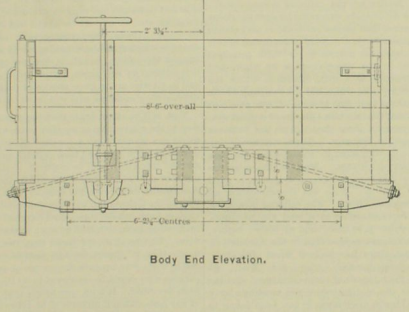
On the upper surface of the pontoon there are a great number of hydraulic rams, of varying diameters, connected together in systems. These correspond in location with the bilge and keel block screws, and when the rams are run out, the screws and blocks are raised by the rams. In raising a ship, as soon as the pontoon has lifted enough to bring the bilge blocks in contact with her bottom, the rams are raised and they take her weight until she is clear of the water. The bilge blocks are so arranged and the size of the rams so proportioned that the whole bottom of the ship is supported, and even a portion of the thrust of the cargo on the sides is resisted. The arrangement of the hydraulic rams is very ingenious, but only those interested in a practical way in navigation will understand all the objects which it has been desired to accomplish.

As soon as the cradle reaches the surface of the water, men go in upon it, and nuts on the stems of the bilge blocks are run down so as to take a bearing on the girders of the cradle. By withdrawing the rams the weight of the ship is at once transferred to the cradle, and as soon as the pontoon reaches the proper height, bringing its rails level with those of the main track, the cradle is ready to be moved forward.

Having once got the vessel on this immense transfer-table, it is evident that no change of direction in the lines of track on which it is to run can be possible. The shortest curves that can be used are to be of not less than five miles radius. The nature of the country, however calls for sharp changes of direction in the line at five or six different places. In addition to this, provision is made for turn-outs, so that vessels may pass each other without delay. All these objects have been accomplished by means of hydraulic or floating turn-tables. These consist of pontoons, 450 feet long, 70 feet wide and 12 feet deep, placed in docks or basins, which when not in use rest on piers in the bottom. When the cradle with the vessel is run upon one of the turn-tables, the water with which it has been partly filled is pumped out till it floats clear of the bottom. It is then swung through the proper angle, precisely like an ordinary table, till the desired line of rails is met. Water is then let



End Elevation and Section



Body End Elevation.

into the pontoon till it sinks and takes a bearing on the bottom of the basin as at first. The cradle is then run off. Lengths of radiating tracks from these turn-tables will enable them to be used for turn-outs.

The pontoon which forms the turn-table itself is built with compartments so that control may be had of the whole apparatus in case the loading of the ship or the position on the cradle should throw an undue amount of weight on one particular portion.

The railway is designed to handle ships of all sizes, not exceeding 5,000 tons. Small cradles to accommodate the smaller vessels will of course be used when possible. It is calculated that from 10 to 12 ships can start from each end every day and make the trip in from 15 to 18 hours. This will call for a speed of from 8 to 10 miles per hour, in order to accomplish the 134 miles between the two oceans in one day. The cost of a railway, capable of handling ships of 5,000 tons burden and less, is estimated at about $75,000,000. The motive power will be, according to the present plan, ordinary freight locomotives. The lines of rails will be of standard gauge, so that ordinary rolling stock can be used.

The commercial features of the scheme have been well considered, and there seems to be little doubt in regard to the possibility of making it a grand commercial success. Politically, the scheme seems to have been made sure. In 1881, Capt. Eads obtained a concession from the Mexican government extending over a period of 99 years, assuring the right to construct a ship railway over the isthmus, an ordinary railway and a line of telegraph. A million acres of land and many valuable privileges are also granted. Little more could be asked from that government.

Remarkable as is the proposition to carry on a railway a concentrated load of 5,000 tons, the railway engineer finds few points to criticise unfavorably in any of the details of the scheme which have so far been presented. The weak feature, from the car-builder's point of view, is the cradle or car which is to carry the vessel over the road. The idea of carrying such a weight upon a 360-wheel car, without any equalizing device, strikes one as predicating a more perfect road-bed than has generally been thought practicable or even possible. Even this criticism is only directed toward a detail, which, though important, is one that can be altered. There are yet other ways of solving the problem. If the road is to be successful, no doubt a very radical change will be made in this portion of the design; but this will not be a very difficult matter to do. Undoubtedly, single flange wheels will be substituted for those with double flanges, and two wheels may be found better on an axle than one. It would seem also that it would be necessary to increase the number of wheels in the center of the cradle. Brake power must be provided for, and some consideration would seem to demand that a portion of this should be placed on the cradle as well as on the locomotives. In other words, it seems to a practical man that the cradle, considered as a carriage, must be radically altered in order to perform its work cheaply and with success.

Masters Car-Builders' Club.

FREIGHT CAR COUPLERS.

The monthly meeting for November was held on Thursday evening, 20th ult. The attendance was larger than usual.

The President, Mr. L. Garey, announced the subject for discussion, and invited attention to the following letter which had been received by the Secretary from Mr. T. B. Buchanan, of Denver, Col.:

DENVER, COL., Nov. 3, 1884.

To the Masters Car-Builders' Club, 113 *Liberty Street, New York.*

GENTLEMEN: At a former meeting of your club when "Freight Car Couplings" was the subject of discussion, I submitted some remarks upon the subject in general. Now, by your indulgence I desire to offer a few suggestions touching one particular phase of the subject, viz.:

The practicability of dispensing with all loose parts in a freight car coupler. It seems to be assumed by many railroad men, that in order to dispense with all loose parts, it will be necessary to adopt some other mode of coupling than with the link and pin. This is perhaps true so far as the link is concerned, but not necessarily, true as to the pin, for the latter can be and is, in many couplers, so secured as not to be a loose part. But I will pass that matter now to observe:

1. That the discussion of the relative merits of the link and pin as compared with other modes of coupling, does not touch the question of safety to the brakeman, but turns entirely upon the question of economy to the railroad companies —not an economy of men, but of material. Is not the question of greater safety to the brakeman the really vital point that underlies and prompts all this popular agitation of the coupler question? Is not that consideration the prompting cause of all the efforts to cure the evils of the present mode by legislation? Manifestly so. It would certainly be very absurd to suppose that any legislation either would or could intermeddle with the coupler question upon the grounds that the present method of coupling cars was too expensive to the railroad companies. Of course it will be conceded at once that such a consideration is not a proper subject of legislative action. Then it must also be conceded that the only phase of the subject that justifies legislative interference is the necessity for protection to brakemen and others whose business it is to couple and uncouple cars; for the lives and property of other people are neither directly nor indirectly involved. From these considerations it is apparent, then, that those master car-builders who insist upon the dispensing with all loose parts as a *sine qua non* in an improved or safety coupler, would make the whole matter of the selection of an improved coupler turn upon a matter entirely aside from the main point to be gained by a change of couplings. In their minds, economy to the railroad companies is the chief consideration, and not safety for the operator. But they may answer, that if they can secure both the safety of the brakeman and greater economy to the company, why not do so? This brings me to the next point:

2. And here it will be necessary to be much more specific and name several, at least, of the many prominent coupling devices. What device, dispensing with all loose parts, offers equal protection to the brakeman as the best of those which still use a loose link? If the safety of the brakeman is the first and most important consideration, then the foregoing question is logically and properly the very first question to be settled.

There are but few things connected with couplers concerning which all master car-builders are agreed. In fact, I know of but of one thing, and that is, that no matter what improved coupler is adopted, and no matter whether adopted by one road, a few roads, or all the railroads simultaneously, the agreed fact is, that for a long time yet to come brakemen will be required to couple whatever it may be much oftener with some form of common link and pin draw-bar, than with one of its own kind. Hence, it follows, that the new coupler must be one that can be coupled with a common draw-bar with *greater* safety to the brakeman than he can couple two common draw-bars. If this guarantee is not furnished, then the new coupler fails in the very first and chief requirement, no matter what other merits it may have. Let us apply this first and chief test then to a few of the most prominent devices that dispense with all loose parts.

The *Janney*—manifestly more dangerous to the brakman than the coupling of the two common draw-bars.

The *Cowell*—equally, if not more dangerous than the coupling of two common draw-bars.

The *Miller*—equally if not more dangerous.

The *Hilliard*—equally dangerous.

The *Byron*—equally dangerous.

The *Ames*—less dangerous where the common draw-bar is lower or of equal height, but more dangerous where the common draw-bar is higher than itself.

I cannot recall by name many other such devices, but I can sum up the result of my observation and conclusions; to wit, that I have never examined a single one of these devices that did not place the brakeman in equal or greater danger in coupling it with a common draw-bar than when he was coupling two common draw-bars. If the members of the club can agree with me upon the three points thus far set forth—viz., the pre-eminent importance of securing the safety of the brakeman, the absolute necessity of coupling the new with old draw-bars, and the fact that none of the devices now under consideration guarantee upon the whole any greater safety to the brakeman—then it follows, of course, that either some new device dispensing with all loose parts must be brought forth, or else resort must be had in making a selection to those devices which still use a loose link.

Touching the assured economy to the railroad companies by dispensing with the loose link, it is but an assumption, and has never yet been proven to my satisfaction. Statistics have been published of the vast sums of money expended by certain railroad companies in given years for links and pins; but no such statement that I have seen is by any means conclusive as to the comparative real cost of the link and pin devices and other forms. From the gross amount paid by any railroad company for links and pins in any given year, must be deducted, first, the cost of pins or a large percentage of it, for the best of the improved link and pin devices secure the pin from loss. In the second place you must deduct the cost of links and pins purchased for new cars. Then from what remains must be deduced a large part of the value of broken fragments of links and pins which can be and are saved to the companies. Then from what still remains must be deducted the cost of repairs to the substitute for a loose link, for this substitute is also subject to breakage, and finally, from the remainder, if any, must be deducted the additional first cost of the device which dispenses with the loose link. My impression is that before the last of these subtractions is made, the "remainder" will have disappeared, and the minus quantity at the end will really be a plus sum to the credit of the loose link device. So far as I have been able to investigate this question, the advantage in point of economy seems clearly on the side of the loose link device; but any conclusion in the premises would necessarily be based upon some very uncertain estimates, and, consequently could not be entirely conclusive. As, for instance, the cost of repairs to the substitute for a loose link would depend upon what substitute was used, and its relative liability to breakage which could only be demonstrated by actual use. Very respectfully,

T. B. BUCHANAN.

Models of the following couplers were on exhibition in the room, each of which was, upon invitation of the President, briefly explained to the Club:

Fish's Universal Automatic Coupler, Wabash, Ind.; Eureka Automatic Coupler, Grand Rapids, Mich.; W. H. Thurmond's Coupler, Forsyth, Ga.; Robinson Coupler, Bellefontaine, O.; Barnes Automatic Coupler, Rochester, N. Y.; Nichols' Ball-Joint Coupler, Elmira, N. Y.; Howard's Automatic Coupler, Belvidere, Ill.; National Freight-Car Coupler, Lynn, Mass.; W. H. Meadows Coupler, Tennessee; Wilson & Walker Draw-Bar and Coupler, Pittsburgh, Pa.; Wallace Coupler, Mt. Vernon, Ill.; Robt. H. Hitchcock's Coupler, Springfield, Mass.; Manly Howe's Coupler; Frank H. Stanford's Coupler; A. B. Holmes' Coupler; W. Emmett's Coupler, Logansport, Ind.; T. B. Nutting's Coupler; E. C. Hilton's Coupler; Curtis & Wood's Coupler, Conshohocken, Pa.; Know-Nothing; Hoosier Automatic; Eureka; and some others, the names of which could not be ascertained.

The following Preamble and Resolutions were presented by Mr. R. C. Blackall, of the Delaware & Hudson Canal Co., and unanimously adopted:

Whereas, It is generally conceded that Automatic Freight Car Couplers must of necessity be adopted by the leading railroads of the country at an early day, and whereas it is our belief that the railroads are not as yet in possession of sufficient information as to the merits of the several devices now actually in use to warrant them in the adoption of any of them without further practical test.

Resolved, That the Executive Committee of the Master Car-Builders' Association examine critically such automatic couplers as are now in actual use, recognizing as the prime requirement in each coupler that it must be capable of interchange automatically with each other, the committee to select not more than five of the most practical of the devices examined, and report what devices were so selected to its members within thirty days.

Resolved, That the Executive Committee thereupon be authorized to negotiate with a corresponding number of railroads, each of which shall equip twenty-five of their freight cars, (free of royalty to patentee) with one of the couplers which may have been selected by the Committee; such cars to be at once placed in the service at such points and in such traffic as will permit of a careful record being kept of the performance of the coupler, and more especially of each and every failure, with the cause therefor, a report of such a failure to be made in writing to the Executive Committee every thirty days for three months after such cars have been placed in service.

After some further discussion, the meeting adjourned.

Communications.

The Car-Builders' Association and the Adoption of Standards.

To the Editor of the National Car-Builder:

In an editorial article in the CAR-BUILDER for November, on the subject of "Standards," the opinion seems to be expressed that the general adoption of uniform parts in the construction of cars is impracticable without "compulsion" or "the interposition of law," and in this country, you say, this, too, is impracticable, and that thus far the attempts which have been made to bring about uniformity in the height of draw-bars, the form and proportions of axles, journal-bearings, boxes, etc., have been futile. You admit that if the various parts of cars were made uniform that "the result would be an immense saving in the cost of maintenance," but owing to "individual preferences, private interests in patents covering alleged improvements, and the desire of those connected with the mechanical departments of a multitude of roads to originate something a little better than some other road has got," the present diversity seems to be is unavoidable. Now, if this view is the true one, then the efforts which have been and are still being made through the Master Car-Builders' Association are wasted, and the Association might as well disband. That the Association has not accomplished what might reasonably be expected of it in the time—eighteen years—that it has been organized is perhaps true, but is it "manifest," as you say, "that under the voluntary system, which leaves each road to do as it pleases, regardless of what other roads do, there can be no standards, except local ones, and even these will be liable to periodic changes more or less frequent?" The apparent truth of this statement, if it is analyzed, will probably be found to be due to its indefiniteness.

In the first place, what is meant by "standards" in the quotation? If it means *universal* standards, that is, standards common to *all* roads, then it is no doubt true that under "the voluntary system" it is impossible to secure their adoption in that sense. But to gain some or most of the advantages growing out of the adoption of standards, it is by no means essential that they should be *universally* adopted. If two companies agree to use the same thing the evil of diversity is to that extent obviated. Still more so if three, four, five or a hundred companies agree to use a standard—the advantages are proportionate to the extent of its adoption. In that sense the Master Car-Builders' Association can and has accomplished a great deal. No one with any experience in dealing with men will expect by "the voluntary system" to secure the *universal* adoption of any standards such as have been recommended by the Master Car-Builders' Association, but the parts of cars enumerated in your article have been adopted and used on scores of railroads, and their use is rapidly extending. In this sense, then, *there can be and are standards* which are not merely local ones. The standard axle journal-bearing, box and pedestal, height of draw-bar, screw-threads, dimensions of dead-blocks, have already come into extensive use on many roads, and their adoption has been of incalculable advantage. The wheel gauges and system of marking cars have not yet had time to come into extensive use. The list of subjects which will be reported on and discussed at the next annual convention shows that the Association has now committees which were appointed to investigate and report on standards for the treads and flanges of wheels, freight car trucks, brake-shoes, brake-beams, etc., freight cars to carry 60,000 lbs. of lading and automatic freight car brakes. With the exception of the last, the Association will probably recommend a standard for each one of these parts at its next convention.

A great deal has been said because the Association has *not* recommended an automatic coupler. You say—in another article—that "the Master Car-Builders' Association passed a resolution last June, asking railway companies to defray the expense of making tests (of car couplers), and designating Mr. M. N. Forney to superintend and record the testing, but, so far as we are informed, the resolution is not likely to be prolific of results."

As your statement of this action is slightly inaccurate, and as the latter part of the sentence quoted is perhaps susceptible of an ambiguous interpretation, and furthermore, as there has been considerable inquiry with reference to the proposed tests, it may be explained here that the Association did not *ask* railway companies to defray the expense of making tests, as will be seen from the following resolution, which was adopted at the Saratoga meeting last June:

"*Resolved*, That the Executive Committee issue a circular to all the railroad companies represented in this Association, setting forth our plan of retaining Mr. M. N. Forney to devise, conduct and record tests of automatic freight car-couplers, and asking them to signify their willingness to sustain their pro-rata proportion of all expenses incident to such tests."

From this resolution it will be seen that all that was done was to instruct the Executive Committee to issue a circular to railroad companies, asking them whether they would be willing to bear their proportion of the expense of making an investigation of that kind. As the Executive Committee, for satisfactory reasons doubtless, have not issued such a circular as was contemplated in the resolution, it has not been ascertained whether the railroad companies would be willing to bear their proportion of the expense of the tests, and so far no one has been authorized to make them.

The fact is, that the question of automatic couplers is an extremely difficult one for the Association to deal with. With three or four thousand patents to choose from, a selection of the best is not easy, and no matter what a committee or investigator should recommend as a coupler, his wisdom, his knowledge and his motives probably would be questioned. Besides the mechanical difficulties in the way of determining which is the best coupler, the many patents which have been issued have created numberless little pools of private interests which form obstacles in the way of any action. It might occur, too, that a competent person might spend months or even years in investigating the merits of car couplers and then be obliged to report that none of them complied with the requirements. The fact that so many thousands of inventors have for forty or fifty years been at work on this problem and that it still remains unsolved, is tolerable strong evidence that it may be insoluble, or at least insoluble under the conditions that a solution has been required. It would be about as reasonable to infer inefficiency in a medical society because the doctors have not discovered a cure for cholera, as it is to condemn the Car-Builders' Association because they have not found an automatic coupler or agreed upon one which complies with all the requirements.

In passing judgment on the Car-Builders' Association, it must be kept in mind that one of its chief purposes is to bring about *agreement* among its members, who come from all parts of the country with an almost infinite variety of characteristics, experience, education, training and interests. Any one who has ever done jury duty knows how hard it sometimes is to get twelve men to agree about comparatively simple matters, even after they have devoted days or weeks to hearing all that can be said for and against the questions submitted for decision. The Master Car-Builders' Association consists of a jury of about two hundred men, among whom some degree of agreement must be secured before standards can be adopted. There are now over 460,000 cars represented in the Association, which are worth more than $150,000,000. Any action which will influence property of that value, or even any considerable proportion of it, should and must necessarily move slowly.

It is, however, no doubt true that the Association has not been, and is not now, as efficient as it should and might be. It must be remembered though, that until October, 1882—to quote from a circular issued a short time before by a Committee on the Reorganization of the Association—it was "a voluntary organization of the master car-builders of this country and Canada, and, as an Association, it received no support whatever from the railroad companies, which are the owners of the property which is intrusted to the care of the master car-builders, and the improvement of which is the chief subject of consideration and discussion at their meetings. Neither are the railroad companies directly represented in the Association, excepting by such exertions in behalf of their employers as their master car-builders may choose to make, if they are members." As a natural consequence of this condition of things the railroad companies or their principal officers took little interest in the Association or its work, and generally regarded its meetings as a mild diversion, which the car-builders got up to enjoy, and as it did the companies little harm. It must be admitted too, that at some of the meetings held before the date named, the members displayed a great deal more interest in the diversions than they did in the business which nominally they met to transact. There was usually no obligation imposed on those who went to the meetings to look after the interests of their employers. Most of the members paid their own expenses and were not averse to having a good time, and they usually had it. With the reorganization an important change was brought about. The railroad companies were asked to appoint representatives to attend the meetings. This many of the companies have done, and as stated before, there are now over 460,000 cars represented in the Association. The consequence is, that there has been a direct obligation, imposed on the representatives who are sent, to look after and attend to the interests of their employers, and the result has been that since the reorganization the meetings have been better attended and much more interest has been taken in the business of the Association. It is natural that a car-builder who receives a written appointment from his superior officer, and is instructed to go to the meetings of the Association, and is charged with the duty of representing the interests of his employers, will attend to business better while there than he would if he went of his own volition and paid his own expenses. As remarked before, a great change in this respect could be and was observed in the late meetings of the Association. The representative members attended the meetings faithfully, and showed that they were interested in the proceedings, and this had the effect of attracting the active members, and if the annual reports of the last two meetings be compared with those of previous years, the improvement will be at once apparent.

Still, it is very plain to any one who has been interested in the Association and its work, that some very important mechanism in its organization is still needed to make it as effective as it should be. The plan of having various subjects investigated and reported on by committees works very well so long as the matters requiring the attention of the committees are comparatively simple, but when they are at all intricate, or require hard work or continuous thinking or investigation, then the committees fail to do what is required of them. The reason for it is, that the persons who compose the committees are busy men, and it is seldom that they are able or willing to devote any more time to the investigation of the subjects submitted to them than is required to attend one or more committee meetings, write a few letters or discuss the matter colloquially with their friends. Two subjects which have been reported on several times may be taken as an illustration—brake-shoes and a standard truck. Now, it happens that there are probably several hundred different kinds of brake-shoes in use. The question for a committee to determine is which of them is the best. To answer this question, the committee should have an intimate knowledge of the merits and defects of all or most of the shoes in use. They should know the relative weight of each, and when and how they fail. They should be compared with each other in the most careful way, and whatever pattern of shoe is recommended the recommendation should be the result of a process of deduction based upon facts and reasons which can neither be denied nor refuted. No committee on brake-shoes has ever, so far as the writer knows, taken the trouble to investigate the subject in such a thorough manner, and consequently, the Association seems to be as far from adopting a standard brake-shoe as ever.

At the last annual convention a committee made a report on a standard freight car truck, and the subject has again been submitted to a committee to be reported on at the next meeting. In the report referred to, the committee proposed a number of entirely new and untried patterns of trucks, and did not recommend any pattern. The Association, very properly, did not approve of what was proposed, and referred the matter back to a committee again. Now, supposing that a large car manufacturing company was about to build some thousands of cars which they also expected to keep in repair afterward at their own expense, and that under these circumstances they were called upon to adopt a standard truck for these cars—how would they probably do it? Is it at all probable that they would for a moment consider the adoption of a novel and untried form of truck? If they were clear-headed business men, they would say that the first and most essential thing is that they should take no risks, but that they should aim to be entirely sure that the truck adopted was safe and durable, and as cheap as is consistent with safety and durability. They would, therefore, naturally get drawings of the trucks which it has been found are working most satisfactorily, and, after collecting these together, they would compare them and select the best, or the best feature of all, and design a new truck without leaving the paths which experience had marked out. In doing this, if they understood their business, as they probably would, they would compare not only the weight of the whole of each of the trucks, but they would compare the weight and size of the different parts of each truck with those of the others, and thus make a selection for their guidance. They would also make inquiry of those who used the trucks and learn when and how the most frequent failures occurred. Having accumulated this information, the problem would be submitted to an experienced and skillful draughtsman, who has the training, experience and natural aptitude to design such work. He would be guided by the information collected in the manner described, and would then make a careful drawing of the truck, embodying all the desirable features which the previous investigation has pointed out, and eliminating, as far as possible, all the defects. Experiments would probably be needed to determine and equalize the strength of some of the parts, such as the frame, etc. When the general design is completed, separate drawings of each part would be made, showing all the details with the utmost exactness. These ought then to be submitted to the pattern-maker, the foundry man, the boss blacksmith, etc., to see whether some changes could not be made which would lessen the work in making the parts. After all the changes which discussion and reflection can suggest are made, the patterns, castings, forgings, etc., should all be made and one complete truck constructed. During its construction some modifications and changes which could be advantageously made are quite sure to suggest themselves, and if the designer of the truck is wise, after it is finished he will again invite criticism and suggestion, and call in all who are to have charge of doing the work to freely express their opinions, and will profit by their suggestions.

Now, is it at all probable that the committee who are to "present to the convention in another year what they would recommend as a standard truck for cars of 40,000 lbs. capacity," will devote as much time and take as much trouble to evolve the best form of truck as would be required if they adopted the method outlined above? If they do, it will be the first committee of the Association which ever has done it. The truth is, that the members of the Association who are appointed to act as such committees have not the time, some have not the ability, and few the inclination to do this kind of work in the way that it ought to be done. This being so, it follows that the Association cannot do much that it should do, and that is expected of it, unless it can in some way procure the service of one or more competent persons who would be employed to do the kind of work that has been described. It is an open secret that the present Secretary of the Association is anxious to be relieved of the duties of his office. That fact permits me to write freely in relation to this subject and the needs of the Association, whereas, were it otherwise, self-interest would impose silence. The kind of help that the Association needs is that of a person competent to undertake investigations of the kind which are now referred to committees, and which require more time and labor than the committees can give to them. His duties should be such that any committee could call on him to co-operate with them, so that the main part of their work would be done by him, and they would then become an advisory body, to deliberate and decide on that which he would prepare for them. He ought to be a person who has had a great deal of experience and knowledge of car construction, a good designer of work, with the ability to investigate a subject thoroughly, and a judicial turn of mind which would not draw conclusions until the evidence was all in, be sure and conservative in his judgment and of systematic habits, so that the records and archives of the Association would be properly preserved. These are yearly becoming of greater importance, and no steps have so far been taken for their preservation. Many or all of them might be lost by a fire or the death of the person who has the care of them. The Association should have an office in a fire-proof building, where its books and papers would be stored, and this office, to some extent, should be a drawing office for all the railroads of the country; that is, it should be prepared at all times to furnish prints of the standard drawings which the Association has adopted. It is of the utmost importance, too, that when the Association does adopt a standard, that a careful and accurate record of it should be made. As much pains should be taken to secure and preserve its accuracy as is taken in making a title to a piece of real estate. Then, too, no time, trouble or skill should be spared in perfecting standards. If the weight of the standard journal-bearing, box or pedestal could be reduced a single ounce and leave it as strong as before, it becomes of great importance when these parts are reproduced by hundreds of thousands. A single hammer blow saved in the construction of a truck would amount to 460,000 × 2 = 920,000, or nearly a million hammer blows if all the cars, or as many as are represented in the Association, are equipped with new trucks.

Now the services of such a man as has been described would be valuable, and if the Association and the railroad companies want the services of such a person in the capacity described, they must expect to pay for them. The plan, to sum up briefly, is, that the Association should secure the services of a competent person to act in the capacity of manager or engineer, or whatever else it may please the members to call him. It needs a permanent office in a fire-proof building, and, to carry out these suggestions, more money than is now supplied by its present revenue. Considering the immense value of the property which is represented in the Association, and over which it exercises at least some influence, it would seem as though it ought not to be difficult to secure an annual income sufficient for the purposes indicated.

M. N. FORNEY.

The Need of Reform in Freight Transportation.

To the Editor of the National Car-Builder:

Thomas H. Benton, in a speech made more than thirty years ago advocating a railroad to the Pacific, said:

"Show me cheap money and cheap transportation, and I will show you a rich and prosperous country and a happy and contented people."

These words are to-day far more significant than they were at the time they were uttered. Cheap money we have in this country, cheaper even than statesman ever dreamed of, and the solution of the problem of cheap transportation is exercising the minds of the two great classes most interested in its solution, namely, the shippers and common carriers. The newspaper press of the country, which is recognized as the chief medium of commercial intelligence and education, has shown a strange neglect of this important theme and it is high time that it should receive the attention it demands, especially when the business of our great commercial centres is languishing, our manufacturing industries paralyzed, the legitimate trade of jobbing cities diverted from its natural channels to others spasmodically favored by a war of rates alarmingly injurious to the carrier, who, by force of circumstances or from a spirit of retaliation, plunges his road into such wars, which in the end entail losses on the roads, with no corresponding benefit to the public. With an experience of years in the transportation business, and a thorough study of it in all its ramifications in both marine and inland traffic, I am forced to the conclusion that a reformation must take place, and that it can and will be accomplished by a concert of action between shippers and carriers. My reasons are based on the hypothesis that the interests of these two factors are identical, and that the two together can solve the problem. The enactments of legislative bodies for the regulation of State and inter-State commerce have proved abortive, and in no part of the country have laws been passed regulating railroad traffic that would stand the test of the courts. The reform so greatly to be desired must be inaugurated by a thorough organization of the shippers at all the great shipping points of the country. These organizations should each have a representative, who should be an expert freight man, fully empowered by his association to represent them in all the meetings of the general freight agents of the different transportation companies, and have a voice in the making of rates and classifications. His efforts should be so well sustained by the power behind him that he could demand recognition in any body of transportation men assembled to act upon rates, etc. Let the rates and classification be established in equity and justice by shipper and carrier so as to be satisfactory to both, and when established, let the shipper see to it that any violation of the rates shall be followed summarily and at once by withholding all shipments from the road or roads so offending or by any other penalty that may be prescribed. Let shippers' associations discountence, also, all rebates, drawbacks or favoritism in any form, and hold every transportation company to a strict accountability in the maintenance of established rates.

That the present rates for railroad freights are below a profit-earning basis every well-informed shipper and railroad manager knows, and if continued must inevitably result in ruin to our American railroad system. The classification of freights should be radically changed, and a valuation distinction made. Silks and velvets should not be transported as cheaply as common prints because they are packed in the same kind of box and marked "dry goods;" neither should a barrel of brandy worth ten dollars a gallon be carried at the same rate as a barrel of whisky worth only one-tenth as much; nor a box of fine cutlery as cheaply as a box of padlocks because both are hardware; nor should a cask of fine China and rare bric-a-brac be put on a par with a cask of stone ware, or a case of ladies' shoes in the same category with a box of brogans. No railroad company can afford to transport bullion at the same rate it charges for coal. Let this reform in classification be made for the benefit of the transportation companies, in view of the fact that wrecks will occur, fires will burn, and thieves will steal, and when settling day comes the companies will find themselves better compensated than they now are for the extra risks they have taken in the carrying of valuable goods at low rates.

There is also another abuse which requires attention. Many roads and transportation companies bill goods at shipper's weights, thus offering an inducement to underweigh, which has been taken advantage of, and has grown into a system of petty plundering all over the country, by marking underweights from ten to a hundred pounds per case. The writer saved in one year $27,000 to his road by reweighing New York and Boston freight at St. Louis, destined West, but which had come through in car loads without breaking bulk until it reached the Mississippi River, the freight charges on excess of weight for 1,200 miles east of that river being lost to the carriers. Can it be expected that railroad companies can earn dividends unless they receive a fair compensation for the work they do?

The present war of passenger rates on the trunk lines is doing more toward depressing values in American railroad securities than would a failure in the general produce of the country, and if continued will soon extend to freights and then a panic. The holders of these securities are powerless. They can only look on from day to day and see their investments melt away, or sell out at a ruinous loss to save anything. How to stop these fights and avoid them hereafter is the question. The only sound solution is by co-operation between shipper and carrier through a national association of shippers. There are now several local associations in working order and doing much good, but they are organized only for the protection of the shippers. They should all unite in a grand national co-operative union, in full sympathy with the rights of the transportation companies as co-laborers for reform based upon equity and justice to each. This accomplished, the one great element of uncertainty and doubt will be permanently removed, distrust will be followed by a restoration of confidence, periodical panics in railroad securities will cease and the general commercial interests of the country be greatly benefited by the knowledge that freight rates are settled, fixed and immovable. I believe that transportation companies would hail with delight the inauguration of such an association with such a policy, and would at once join hands in bringing order out of chaos and revenue to their lines. There will soon be enough for all to do. The railroads are only a few years in advance of the country, which is daily growing and will never stop. The railroad growth is only spasmodic, yet always keeps a little ahead of and assists in the rapid development of the country. Texas alone in a few years will require two trunk lines to handle and transport her surplus produce. Mexico will also be turning over her surplus to our carriers, and when it comes we will be ready for it, but the shippers will want fixed and standard rates that they can rely upon. Upon nothing else can the buying and selling prices of their products be based. Fluctuating rates destroy fixed values and deter commercial men from taking risks in the exchange of products. J. W. J.

Special Cars for Traveling Men.

To the Editor of the National Car-Builder:

Having had for some years to travel with four or five large and heavy trunks, which at each stopping place had to be packed and unpacked and their contents arranged for show, the thought struck me that possibly a special car might be built with the view of carrying samples, and furnishing a kind of store on wheels from which we could sell and deliver as well as sell by samples. Being entirely ignorant of the cost of building such a car and the probable expense of running it, I address you for the purpose of obtaining any information on the subject which you may be able to furnish. The line of goods which I carry is bulky and valuable; much care is needed both in packing and unpacking; and I find myself frequently limited in the quantity of my samples on account of the moderate space at my disposal. A valuable trade in goods which I could sell and deliver could be secured in many places. Any information which you can give me will be of great interest, not only to traveling men, but perhaps to the railroads also.

DIVISION STREET.

[Our correspondent's question is decidedly a novel one, and while it presents many points of interest, we doubt whether there are at present any lines of business which could afford the expense of a special car for carrying samples. In the nature of the case such a car with its occupants, for there must be two at least, would be considered express freight. It would be necessary to cut it out of passenger trains and switch it at every station where a stop was to be made. Such a car could not be sent on freight trains unless it went without occupants. With a porter and a salesman, the laws of most of the States require that the car should be treated like a passenger train, and it would be impossible to run such a car in any but mixed or passenger trains. As a general thing, railroads would look upon such cars with little favor and would probably charge rates so heavy as to make the economical employment of one out of the question. The Delaware & Hudson Canal Co. charge 18 fares for hauling a special car, not their own, over their road. That is, from Albany to Binghamton, a distance of about 140 miles, the charge would be $76. Mr. Young, the superintendent of the road, thinks that in general 20 cents per mile would be too small a rate to pay, but that at the rate of 40 cents per mile it might be possible to make such a traffic profitable. This would make the cost of the car from New York to Albany $60, and $86 from New York to Philadelphia; 40 cents a mile does not seem unreasonable when we consider that on such roads as the Delaware & Hudson Canal Co., the earnings were about 2¾ cents per car mile. We apprehend that in this matter the difficulty would be found entirely in the possibility of getting the roads to handle the traffic. This they will be shy of doing for many other reasons besides those which we have mentioned, as for example, the necessity of their becoming warehouse-men, finding track room for the cars, keeping the cars in particular places on the tracks, keeping parts of the yards clear in order to have free passage to and from these cars, and lastly, the difficulty of getting switching done without interfering with the regular work. The question of the car itself is an easy one; its cost need be but a few thousand dollars, say perhaps from three to four. It would probably be less, if there were no sleeping accommodations. As luxuries are added in the way of berths, sleeping rooms, lavatories and kitchens, the cost might run up to six or seven thousand.—ED. CAR BUILDER.]

Railroads and Safety Appliances.

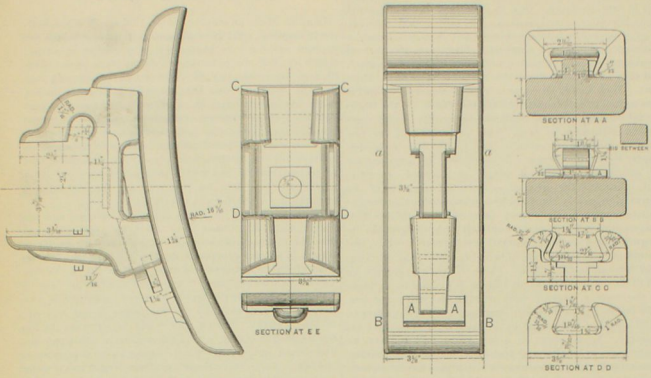
Benj. C. Frew, an employe of the Chicago & Alton Railroad Company, sued the company to recover damages for injuries sustained by having his foot caught in a frog, which caused him to be thrown on the track upon which his arm was crushed by the wheel of a flat car passing over it. The company was charged with negligence in not using blocks or wedges of wood in the frogs, so as to prevent the feet of switchmen from being caught. The trial resulted in a verdict and judgment against the company. The case was carried by defendant's appeal to the appellate court of Illinois, on the ground that Frew was permitted to testify that he had a wife, mother, brother and sister dependent upon him for support, and that defendant's motion for a new trial was overruled.

The judgment of the lower court was reversed and the case remanded. Cases were cited by appellate court decisive of the question of allowing plaintiff to testify in regard to persons dependent on him for support. In the case of the Pittsburgh, Chicago & Fort Wayne Co. vs. Powers, it was held that, "Appellant can in no case be required to support the family of one of its employés who may be injured, even by the negligence of the servants of the company. Such a rule would be carrying the liabilities of such bodies beyond the liability of other persons, and would not accord with the analogies or principles of the law. And to permit such evidence would be virtually to impose that duty upon the defendant. It is impossible for us to know what portion of the verdict in this case was allowed because appellee had a family. The evidence was before the jury for the purpose of enhancing the damages, and we have no doubt it produced that result. This was manifest error." This reasoning, in the opinion of the court, is so conclusive of the question that we can add nothing to it. The court furthermore says:

The company is charged with negligence in not keeping blocks or wedges of wood in the frogs. It appears by the evidence that such devices have occasionally been used in the yard where the accident occurred, but these had been broken and displaced by the wheels of the locomotive and cars, and there was no block in the frog in which appellee caught his foot when he fell and received the injury complaind of. No doubt had the frog been locked with wood it would have been impossible for appellee to have caught his foot in the same; but this fact did not make it the duty of the company to introduce this device for the protection of the switchmen, if by so doing it would have materially increased the perils of its passengers or a larger class of employés in another direction. There is no statute in this State requiring the frogs of railroads to be blocked, nor was there any evidence on the trial of the cause tending to show that such a device was safe and proper to be adopted. The evidence that it would have prevented the injury to appellee did not go far enough; for, as far as the jury could know, the blocks used for this purpose might be impracticable or cause new dangers far more serious than those intended to be guarded against. In view of the fact that the only defect complained of in the frog was that it was not blocked with wood, the instruction given by the court in behalf of appellee, to the effect it was the duty of the railroad company to furnish suitable and safe frogs, and that it was liable for all injuries sustained by reason of the use of defective frogs, must have been understood by the jury as requiring the use of these blocks. There was no other defect alleged to exist to which the instruction could refer. In this the court erred. Whether it was the duty of the railroad company to block its frogs was not a question of law to be decided by the court, but a question of fact to be found by the jury from the evidence; and in this case there was an entire lack of evidence upon which to base the instructions or to justify the court in submitting the question to the jury.

It is the duty of a railroad company in all cases to adopt such means and appliances for the safety of its servants as experience has demonstrated to be necessary, and can be safely used. If, however, the adoption of a new device, which would afford protection against a particular danger, would introduce new dangers more serious than those it would guard against, the company could not be charged with negligence in refusing to adopt it, and the burden of proof is upon the plaintiff who charges the negligence to show from a survey of the whole field that the means of protection could be safely adopted, and that it afforded the desired protection in one direction without the introduction of new perils in another.

THE electrically regulated and controlled Time system, lately perfected by Prof. W. F. Gardner, of the Naval Observatory, has been secured by a body of Pittsburgh capitalists, and a company is being formed for its immediate introduction into the railway service in this country. By this system the clocks of an entire trunk line are maintained accurately correct by a single signal sent automatically once in twenty four hours, whereby all the clocks in circuit are set to correct time. Clocks on the same circuit may be made to indicate the time of any required meridian belt, and every clock so corrected becomes a repeater and may be used to transmit the correcting signal to other clocks. The error of all three hands of a clock, no matter how great, is instantly corrected, and the use of the telegraph line is limited to less than a second.



BRAKE SHOE AND HEAD—LEHIGH VALLEY RAILROAD.

Although this shoe and head is in many respects very similar to patterns in general use, the details have been worked out in a very neat manner, and the castings made both lighter and stronger. A pair of V's, or dovetails, hold the head. The suspension link is locked in place by the brake beam, and the head made fast by the usual key. The sections give the draft, etc., of the wedges and lugs.

The Interior Decoration of Passenger Cars.

[Paper read before the Master Car Painters' Convention, at Boston, by A. A. Kelly, Chester Valley, Pa.]

About a dozen years ago, and just prior to the business panic of 1873, the most lavish expenditure for ornamenting and upholstering of passenger coaches was indulged in, and was carried to such excess that a reaction was finally the result, this being in accordance with the pretty thoroughly grounded rule that one extreme is sure to be followed by another of an opposite character. The rarest and richest woods were employed in fine cabinet work, trimmings and in other ornamental work, and the American passenger coach was made only less regal and luxurious than the veritable palace. The years of business depression which followed the panic of the aforementioned year was not without its effect upon the railway companies, and by the instituting of the most stringent business and financial policy upon their part, many retrenchments were made, and in no direction more closely than in the car constructing and painting departments. Veneering, in its day deservedly popular and a vast improvement upon painted work, had been abandoned for the solid finishes. Now it was again adopted, and old coaches were brought out and their old veneerings scraped and revarnished, and made to look tolerably respectable. Others were painted or handsomely grained; and though these refurbished cars had the appearance of being second-hand at best, yet the plan pursued was not only in perfect accord with the general feeling of the times, but denoted a sound and commendable policy on the part of the company.

Five years or so of this enforced policy of economy was at last succeeded by the revival which followed the great iron boom of 1878–79, which set in motion all the collateral industries again, and gave to business an impulse which soon had its effect upon the railway service, in the demand for finer coaches. By the operation of the same healthful force the companies were speedily able to comply with the popular desire in this respect, and by the aid of inventive genius and liberal expenditure of money were enabled to surpass all former efforts.

Veneering was again discarded and relegated to the past, never more, I venture to predict, to come into general use, as a means of decorating coach interiors. Not that I believe with some that it is a despicable sham or a cheap device, or other species of deception, for I believe it to possess many merits entitling it to a respectful consideration. But it has lived its day; and solid woods are to be preferred instead.

Once in a while you will still see old cars with a veneer finish, and what an antiquated look they have! And now and then one meets with the old-fashioned black walnut finish, with gilt or cream-colored moldings, and similar relics of the former age of car decoration. But mahogany has superseded the black walnut finish, and when put in plain and solid, as it usually is, and made to resemble a mirror in point of lustre, the effect is strikingly rich and elegant. The native hardwoods also come in for a share of popular admiration, the beauty of ash being particularly noticeable. In the coaches of the Pennsylvania Railroad, ash is used exclusively for the interior construction, and the employment of this wood gives great satisfaction to the traveling public, by reason of the cheerful appearance it imparts to the interior. It also possesses a neat and cleanly appearance, not characteristic of dark woods or painted work.

Accompanying this style of finish should be the unique Eastlake ornamentations in designs and carvings, which are based on the principle that ornaments should not be constructed, but constructions ornamented.

As to the comparative merits of the various materials advocated by some decorators for use in interior finishing, other than natural woods, and some of which have been tried, I would advance as my opinion that nothing will more fully meet with what is required of it, as an article of utility and ornamental on in the finishing of passenger cars, than these simple natural woods. I am aware that it has been urged against their use that they will darken with age, often assume a dingy, clouded appearance, and generate an impression that the car is soiled and dirty, even when perfectly clean. Though admitting that this objection is not without foundation in fact, yet it must be remembered that this fault only exists where the finish has not been properly executed by the painter. For certain it is that the wood will retain its natural beauty of color almost an indefinite period, if skillfully treated. I do not believe that the wood should be surcharged with linseed oil, preparatory to applying the fillers, for the effect is to cloud and alter the original purity of the surface. And the evil deepens as the oil dries, by reason of the chemical changes which it undergoes in the process. Corn-starch fillers, though finding many advocates of their use among the members of this association, are open to the same objection as oil, in that they change and darken, imparting a prematurely old appearance. Now it appears reasonable from the very nature of the case, and the idea is abundantly supported by the weight of experimental research, that a filler having as its base of composition silica, which is colorless and not subject to atmospherical changes or other influences which operate injuriously upon most other preparations, must be the best adapted to the purpose of closing the pores of the wood, and thereby fitting its surface to receive the coats of varnish, which are to more clearly bring out the delicate lights and shades and veins, and also to protect the wood. When such a filler is employed and the work skillfully and honestly executed, and the best grade of varnish or oil finish, so called, is applied, we may confidently expect a job that will give satisfaction, and be truly a thing of beauty, if not exactly a "joy forever."

By the aid of ingeniously devised machines, these natural woods are beautifully carved and artistically ornamented in the modern style; and in rural communities we are given all the advantages of decorative effect which would follow the use of hand-worked ornamentation. As the builder puts in all this work, the painter's duty consists simply in properly finishing it, and I have already intimated how this should be done.

As to the matter of head-linings, the subject has received some attention at your hands in former conventions, and I should only be traveling over old ground in rehearsing what you have said regarding it. But I may be permitted to recapitulate some of the points which have been drawn out in those discussions, believing that they will prove of interest. At your last annual convention you discussed the comparative merits of muslin and wood for car head-linings. Some favored wood, as it cleaned up better. Some thought it had all the advantages of cloth, while others predicted that paper would become the future head-lining. This latter material was being used with the greatest success, so it was stated. It appeared that the paper linings were grained in imitation of wood and then decorated. It was also said that an elevated road in New York thought of taking out wood linings, as they were not doing well, owing to dampness, which caused the veneers to peel, and also that the expense of the wood was as three to one against cloth or paper.

It is scarcely worth while to debate the question to-day as to the merits of the different materials suggested, as they are all to be superseded, I believe, by another substance (of which I shall make mention further on), which possesses all the merits of the above articles, with an additional feature which must commend its use to every car shop in the country.

But I wish to say that, in my judgment, no poorer material for a head lining could probably be found than paper, durability and appropriateness being considered. Besides, such a substance would tend materially to add to the already too combustible nature of suddenly car interiors, which of itself should constitute a cogent reason for its non-adoption for the purpose designated. Nor is muslin or cloth much better, if indeed any, than paper, while veneering should be left severely alone. As for the graining on the paper, it is a species of cheap work that will find no favor among those who despise that form of vulgarity in decorative art, and who look for the true and beautiful in all things. Last fall, a writer in the NATIONAL CAR-BUILDER suggested that papers, plain and in relief, and in imitations of leather or in the Japanese styles, might "be used in car work in a most striking and beautiful manner." But the idea of decorating a car as one might decorate an apartment in a house, strikes one as being rather an ignoring of the law of place and utility, which should govern in all such cases. We would not like to associate the idea of a decorated room with a coach, as it flies and rattles over the rails, as the impression gained would be a feeling of insecurity and a sense of the violation of the principle of utility in the construction of the vehicle.

It is a pleasure to note that a very important step in the improvement of passenger cars has just been taken, in the proposition of Mr. George Mann, of Buffalo, N. Y., to make the inside incombustible by using asbestos as an upholstering for seats, materials for curtains, and lining for the entire interior of the car; this to be covered, when used for upholstering or ceilings, with a fine wire cloth on which ornamental designs may be wrought. The adoption of this method will revolutionize the entire system of decoration as now pursued, and render any attempt on our part to outline rules for interior decoration futile. The safety of the passenger being a matter of importance paramount to all others in the construction of the car, it will readily be perceived that the general adoption of Mr. Mann's plan must be simply a question of time, and that passenger coaches will continue to be models of luxurious ease and artistic elegance no one can doubt, for the public having become so accustomed to their use, they are now regarded as much of a necessity as first-class hotels. Besides, the rivalry existing between the different roads will cause them to furnish the handsomest and most convenient cars for the use of patrons, and will insure a very high standard of service in every other respect.

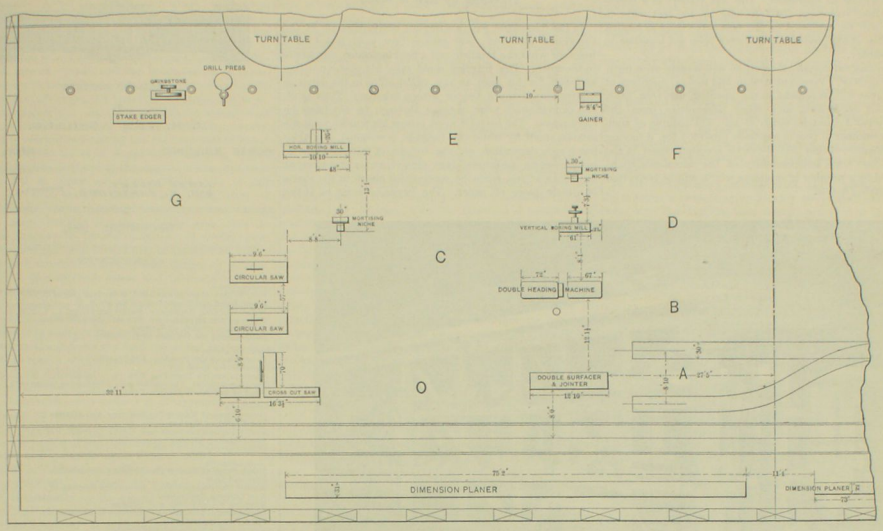
Undoubtedly the best essay that can be obtained on the subject before us is the personal inspection of the handsome coaches now being put out by the various car shops of the country, notably by the Pullman Company and the Mann Boudoir Company. The latter company is proving a dangerous rival to the Pullman. It has some cars on the Boston & Albany road that for sumptuousness and general excellence of finish and attention to comfort are not surpassed, if indeed equaled, by those of any other company.

These cars are divided into apartments resembling staterooms, arranged with high backed sofas by day, and comfortable sleeping berths by night. On entering the car at either end, having passed through the vestibule where the porters' and toilet rooms and buffet are located, a corridor about three feet wide is reached running the entire length of the car on one side. Eight rooms are off from this corridor; five have two and three four berths each, which extend across the car, the occupant lying with his head toward the corridor. There is ample room for dressing, convenient racks for clothing and baggage, and an electric bell connecting with the porters' room. The ventilation is excellent. A scoop on the top of the car near the front gathers the air, which is forced to pass through a tank capable of holding 600 pounds of ice. Beneath is a pile of excelsior kept wet by the drippings of the melted ice above. The air pouring through the moist excelsior is carried through a flue, extending the entire corridor length of the car, and into the bedrooms by ventilators, and the ventilation is rendered perfect by a ventilator being placed at the top of each boudoir, thus affording an outlet for the air. The walls and floor of the car are packed with granulated cork, shutting off heat and sound. Refreshments may be obtained at the buffet at either end of the car. The cars are 64 feet long and 10 feet wide. Such is the description given by some writer of a magnificent triumph of modern car-building.

The July number of the *Painters' Magazine* gave a description of a parlor car built by the Pennsylvania Railroad Company at their Altoona shops, and which is only one of a series of similar coaches to be constructed by this company. Its capacity is slightly less than that of a Mann boudoir car, being 62 feet in length by 9 feet 11 inches wide. The seats are of three feet in length, fixed and movable chairs and sofas, 37 seats in all—six in a compartment, similar to the old-time church pews, only they can be divided off by curtains. The smoking room is large and has 10 seats. The ladies' toilet room is also large, elegantly appointed, and the gentlemen's wash-room is conveniently adapted. A striking feature—and a very original one, by the way—of this car, are the five bay-windows on either side, each 7 feet 4 inches by 2 feet 6 inches wide, with a central window 3 feet wide. Unlike the bay-windows of a house, these windows diverge from a straight line inward, not outward. The car is substantially built, and the general aspect of the interior finish and ornamentation is in marked contrast with old standards. The work is oak, the lower portion—the dado of the car—has a series of very small panels. The ceiling is of one color—a deep Pompeian red—and the whole interior, of lamps, of *repousse*, brass work, paneling, carving, molding, etc., is skillful and artistic.

In conclusion, I would suggest that the principles which govern decoration as applied to the interiors of our homes may be safely followed in the adornment of railway passenger coaches. The scheme of decoration should always be in accord with its surroundings and the purposes for which the vehicle is designed. Extravagances of high art should not be indulged in, though the colors and style of ornamentation may be both light and cheerful. Nothing should be attempted that may conflict with good taste. Traveling by rail is not the pleasantest experience in life, and when one is forced to undertake it the trip should be made as endurable as possible, and to this end all our inventive talent in railway matters should seem to be directed. Passenger cars are public educators in decorative art, and we should be careful that the lessons given are not untrue ones.

MR. R. H. HEMPHILL, who recently resigned the position of Master Car-Builder on the Illinois Division of the Wabash, St. Louis & Pacific road, has received some very handsome tokens of esteem from his former employés at Peoria and Decatur, consisting of a gold-headed ebony cane, a hammered silver water pitcher, and a "Cutler & Son" writing desk finished in ash. He has been on the old Toledo, Peoria & Warsaw, and the Wabash about 23 years as Master Car-Builder, and has always been considered very careful and conscientious in all his dealings, and none were more solicitous or devoted to the company's interests than he. In allowing him to go, the Wabash loses a faithful and efficient officer, and the road that is so fortunate as to secure his services will get a man that is thoroughly competent and reliable, as his connection with the above road for so many years through its many changes goes to prove.



ARRANGEMENT OF WOOD-WORKING MACHINERY AT THE LEHIGH VALLEY RAILROAD SHOPS, PACKERTON, PA.

The drawing shows the location of the sawing and other machines in that portion of the car shops in which the long timbers are finished. The arrangement was designed by the Master Car-Builder of the road, Mr. John S. Lentz, and differs in many respects from that of other shops. An examination of the plan shows it to be a marked improvement, especially in the relative positions of the different machines in respect to their uses and economy of operation.

On one side of the shop a track enters from the lumber yard. At a convenient distance inside the shop door the saw-table is placed, by which the sticks are cut to the desired dimensions. Between the saw-table and the wall the distance is 32 feet, giving room to pile the lumber, if necessary, before sawing. After sawing it may be piled at *O*. Next, beyond the saw-table, is the double surface and planer, which dresses the four sides at a single operation. The sticks are at once piled on the further side of the machine at *A*. In this pile they are conveniently located for passing back through the double-heading machine, from which they are piled at *C*. Just before entering the tenoning-machine, the pile *A* is handled, and repiled at *B*, and at the same time is marked off so that the stuff is ready for all the subsequent operations. From the pile *C* it returns through the vertical boring-mill, and is piled at *D*. Almost in front of this is the mortising machine. After being mortised and piled at *E*, it passes back through the gaining-machine, in which it is finished, and when piled finally at *F* is ready for distribution to the building tracks, which are on the other side of the turn-tables.

By this plan, no piece of timber is turned round in its passage through the shop, nor does any timber have to be piled or handled twice between any two consecutive operations. This is as it should be. In addition to this there is no carrying of timber from one machine to another. The delivery from each machine is so arranged that when the lumber is piled as it comes out of the machines it is conveniently situated to feed the next machine. It is not uncommon in shops to find machines arranged tandem, so that the work passes from one to another longitudinally. This plan has several disadvantages. It spreads the work out at great length along the whole side of a shop, perhaps; it separates the machines so that the transmission of power to them is exceedingly awkward, and involves long lines of shafting or long stretches of horizontal belting.

When placed as shown in the diagram, the machines are within short distances of each other, and can be driven by a single short line of shafting, and the lumber which is passing through them is conveniently distributed on both sides. Although the timber is moved up and down the shop, its direction of progress is really across, and the floor space occupied is more conveniently disposed and can be better inspected than in shops where the machines are placed tandem instead of abreast.

To some extent the work on draw-timbers, brake beams, buffer blocks and other small pieces, is arranged in a similar manner. The machines for this work are located at the upper end of the shop and are not shown in the plan. In their finished state, they are delivered on the side of the shop next the erecting tracks. At the upper end of the shop are placed the saw-gummer and grinding machines and the universal wood-working lathe, on which all the handles used on the road are turned. Here also are placed the sand-papering machines for finishing the handles.

All parts of the shop are connected with each other by standard gauge tracks, with turn-tables located at convenient points for transferring. In addition to these tracks, there are narrow gauge lines, forming another system, and which are used for handling heavy material and transporting supplies of all kinds.

Just below the shops, and conveniently connected with them by several tracks, is the lumber yard. The streets are well laid out, and the lumber is admirably piled on good foundations. Numerous hydrants and barrels at frequent intervals give a very good fire protection to the yard. One feature introduced by Mr. Lentz appears to be new. This is the erection of temporary sheds over the piles to protect them from the weather. These sheds are without sides, and are roofs supported on scantlings at the corners and properly braced. They might even be made like the roofs placed over hay stacks, and arranged to raise and lower so as to accommodate the varying heights of the piles. These coverings are built of condemned lumber, and cost only the labor and nails used in putting them up. As they keep out the rain and protect the lumber from the sun, while allowing a free circulation of air, they are considered a valuable feature. With them the piles are as well housed as if placed in drying sheds.

Running Freight Trains on Sunday.

The Massachusetts Railroad Commissioners have rendered a decision in the matter of certain remonstances against the unnecessary running of freight trains on Sunday on the Boston & Albany road. The Commissioners speak of the tendency in conducting railroad traffic to do unnecessary work on this day, to the manifest danger of diminishing the efficiency of employes and as a consequence the safety of trains, arising from the want of a day of rest, which is required in order to secure health, vigor of mind and body and efficient service. The managers of the above-named road are therefore recommended to carefully consider the question whether there is any need for the running of as many freight trains as are now run on Sunday, and that such managers confer with those of the New York Central & Hudson River and other connecting roads, so that in delivering freight to the Boston & Albany, regard may be had to reducing the number of such trains, and that live stock, arriving on Saturday, may be, as far as possible, delivered in whole trains and not in parts of trains composed largely of general merchandise, so as to reduce the number of trains which humanity requires to be forwarded on the Lord's day; and that they pursue this end of lessening Sunday work, and thereby promoting the welfare of their employés, not in a formal and perfunctory manner, but with the same zeal and interest with which they always seek to perfect the equipment and physical condition of their road. It is also recommended that when Sunday work is necessary, care be taken that one day's rest in seven be secured to every man. And the same advice is given to all railroad managers in the State. Above all, it is recommended not only that no unwilling employé shall be compelled to labor habitually on Sunday, but that all employés be effectually assured that they shall not be exposed to risk of discharge, or to any molestation because of their objection to such labor, for the commonwealth will not endure that the corporations which are its creatures shall inflict anything resembling punishment upon any man because his conscience forbids him to work on the Lord's day.

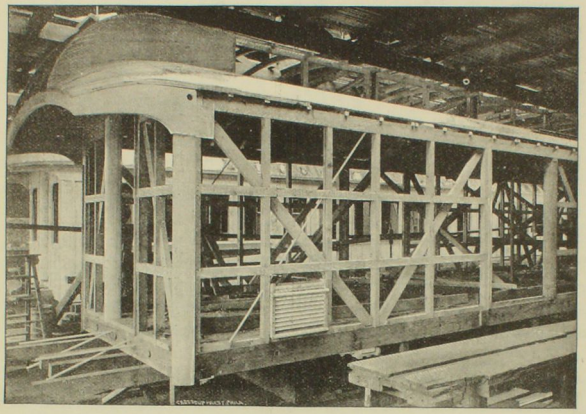
The New Orleans Exposition.

The Exposition will be formally opened December 16. As originally planned, it was intended to be a cotton centennial, but it has developed into a great international fair of peculiar significance, its geographical location rendering it accessible to the products of Mexico and the States of Central and South America, which have hitherto been but meagerly represented in similar displays elsewhere. In these respects alone, the Exposition will be exceedingly attractive and command wide attention, not only on account of the commercial importance of our trade with these countries, but the interest and curiosity which an extensive display of their natural, industrial and artistic products cannot fail to excite. The magnitude of the preparations that have been made, especially in the size and attractiveness of the Exposition buildings and their adjuncts, is such as to eclipse, in many respects, all previous efforts of the kind.

The main building is said to be the largest ever erected. It is 1,378 feet long and 905 feet wide, and is intended for general exhibits. Machinery Hall and Music Hall are subdivisions of the main building. The Government building, intended for United States and State exhibits, is 885 by 565 feet. This structure was not included in the original plans, but has been erected to meet the numerous and increasing applications for space. The display in this building alone will be a mammoth exhibition. Horticultural Hall is 600 by 194 feet in dimensions. It is located on high ground and is surrounded with groves of live oaks. The interior will be a vast conservatory of tropical and semi-tropical plants, flowers, fruits and shrubbery in their various stages of growth. The Mexican national headquarters is a quadrangle of 190 feet front and 300 feet in depth. Its Moresque style and Oriental decorations of gold and green, combined with other tints, and a terraced gallery in the interior court, with rarest plants and flowers and gorgeous birds, will convey a fair idea of the tastes and characteristics of the Mexican people. The building designated for Factories and Mills is 350 by 120 feet. It is an iron structure, and in it are the cotton exhibits, showing the great staple in all stages of manipulation from the boll to the bale. Machinery for the manufacture of sugar, the harvesting and milling of rice, wood-working, brick and tile making, etc., are located in this building; and adjacent thereto extending towards the river, are some forty saw-mills,

which will be in operation. The Art Gallery is a corrugated iron structure, 250 feet long by 100 feet wide, in which will be exhibited to the best advantage as large a collection of art products as has ever been got together in this country.

It is expected that the Exposition will remain open until the 1st of May. President Arthur and several members of his cabinet will be present at the opening, also Gen. Diaz, President of Mexico, and other notabilities from the republics and countries south of us. The lodging of such a great number of people has been provided for, it having been ascertained that 60,000 can be accommodated in the city at one time, independently of the accommodations afforded by a number of steamers which will be converted into floating hotels.



BAGGAGE AND EXPRESS CAR—ILLINOIS CENTRAL RAILROAD.

The engraving, which is made directly from a photograph taken in the shop, represents one of these cars as it appeared while in the course of erection, showing the frame just before covering in. The sills are 5 inches by 8 and the car is 50 feet 8 inches long over the end sills, which gives a length of 50 feet in the clear inside. The frame is 9 feet 8 inches wide. These dimensions give ample space to make alterations if they become necessary. The stringers are 4 by 8 and the centre sills 4½ by 8 inches, with 6 by 8-inch end sills. The posts are 2 by 3 inches and are 6 feet 2 inches between the shoulders, while the braces, which are of oak, are 2½ by 4 inches. One brace starts from the transom and goes to the end of the car and another goes to the door post. This form of bracing holds the end of the car up very well and has given good satisfaction. In addition to this a ½ rod is run from the end of the sill to the top of the post over the transom. The belt rails are 2 by 3 inches and the plates 3 by 5½ inches. The rafters are 1¼ by 2 and have a 10-inch rise. There are seven iron carlins in the car. These are ⅜ of an inch thick and 2 inches wide. The engraving shows a little less than half the length of the car, and at first glance it might be supposed that the door was in the middle. This is not the case, however, there being two doors on each side 11 feet from the ends. Half-inch rods are let into the posts, as shown, just beyond the ventilator in the second panel from the end. The body rods are all ⅜ except those at the ends, which are ½. The ventilators near the ends of the car are a new and good feature, and have proved very advantageous where fruit has to be carried. They are made separate from the frame of the car, and are self-contained, so that they can be finished and put in place like a hood. They are so constructed that the wet is excluded while a free circulation of air is secured. The floor is of southern pine 1½ thick, and laid with lapped joints. From the engraving it will be seen that the car is of unusual strength and solidity. The four doors make it a very convenient one for loading and unloading, while the two end doors provide the usual facilities for passing from one end of the train to the other. The Master Car-Builder of the road, Mr. W. B. Snow, designed these cars with especial reference to the wants of the road, and has built several of them, which are now running.

McKee, Fuller & Co., of the Lehigh Car, Wheel, and Axle Works, at Catasauqua, Pa., have just completed a large addition to the forge building, which was inadequate on account of their increasing business. They are also having a new furnace and a new steam hammer of 2,500 pounds capacity placed in position. The capacity of the forge department will be doubled. The works are at present busily employed on large orders.

Traveling by Rail in Spain.

In the first place, writes a foreign correspondent of the Cincinnati *Enquirer*, you cannot buy your ticket at a hotel, or what the English call a booking-office, anywhere in the town. The traveler must take his place in a line and wait for his turn at the ticket office in the depot, a matter sometimes of ten or fifteen minutes. Then next, you cannot check your baggage through in any haste by any means. The traveler must follow his trunks with his tickets, stand by while the luggage is weighed, and then pay a sum depending on the weight of his baggage, in some cases an additional fare almost, never the same at any two stations, when he receives his check in the shape of a little piece of paper. The baggage must be at the depot at least fifteen minutes before the departure of trains, else the company has the option of refusing it. Here, too, the traveler must take his place in line and wait his turn. Having secured his baggage ticket he now proceeds to the train, having to put down his hand-bags, open his coat, and display his tickets before being allowed to pass the door or gate. Finally he is shown or takes his place in his coach.

But before this termination of his labors he must pay out a number of little sums to two or three porters who have made themselves useful in the disposition of his baggage, wherein he may congratulate himself if he has taken the precaution to have about him much small money of the land.

The cars in Spain are built in compartments, as in the rest of Europe, and though subject on this account to many inconveniences, afford a degree of seclusion unknown with us, which goes far with quiet people to compensate many disadvantages. To get this seclusion, however, it is necessary to travel first-class, for, as Tom Marshall once said, in looking over an empty hall at 25 cents admission, the free house on a previous night having been full, "Money is a great purifier."

But the greatest inconvenience of all in Spain remains yet to be mentioned, and that is the miserable slow rate of travel. The trains in Spain run at the average rate of fifteen miles an hour. Now, to one accustomed to speed, to great speed, as we know it on the limited express, travel at the rate of fifteen miles an hour is tantalizing all the time. I heard an American lady say once: "Why this is like getting ready to stop all the time." There is exactly this sense of continually checking up and there is no excuse for it in a land so flat as that over which most of the roads run, and no other explanation except that of the habitual sloth and sluggishness of the people.

Everybody knows what a horrid nuisance the proximity of a railroad is with us. The engineers and firemen belong, for the most part, to that class of people who delight to make a noise, so there is the clanging of bells and shrieking of whistles all the time. Well, the Spanish locomotive tenders can be pitted against all the rest of the universe in this respect. One fellow rings a bell, another blows a whistle, a third blows a horn, the engineer blows his whistle as long as the steam holds out, the fireman rings the bell until his arm is paralyzed, and then at last we move.

You wouldn't think, to look at the little things, a Spanish locomotive, with its train, that it could possibly emit or at least sustain, such hellish discord all along the way. I never saw a train without being reminded of the children's toy engines and cars in the shop windows at home; and I have often thought what a pretty graduating scale it would make to put on the track, end to end, first a child's toy train, next a Spanish train, third an average train of the rest of Europe, and last one of our own thunderers like the great volcanic monsters of the Pennsylvania Central.

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Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

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THE COMMITTEES OF THE CAR-BUILDERS' ASSOCIATION.

We print elsewhere a list of the committees of the Master Car-Builders' Association, together with the subjects upon which reports are expected to be made at the meeting next June. In view of the importance of some of these subjects, the frequency with which they have been discussed at previous meetings, and the general expectation that some decisive action must soon be taken upon them, it is gratifying to note that the committees are composed of men of large experience and unquestioned ability, and who represent in the Association a very large proportion of the aggregate number of cars in the country. Although each member of these committees is fully alive to the nature of the work to be done, and the limited time which remains for doing it, it may not be out of place to summarize briefly the leading topics which will engage their attention.

1. A standard form for wheel treads and flanges, and a maximum and minimum limit-gauge for wheels of interchange cars. These subjects were discussed at the Saratoga meeting, but without result, except to refer the whole matter to the committee which is to report next year, consisting of Messrs. Goodwin, Forney, Blackall, Cloud and Wallis. Any one who is familiar with the previous discussions of the subject, can well understand the al-

most insurmountable difficulties the committee have to contend with. A vast amount of interchange traffic has to accommodate itself, not only to a difference of ¼ an inch in track gauge, but to differences caused by measuring the gauge from different points on the rail. Exactness of gauge between wheel flanges would seem to be impossible as wheels are now made, and the limitation must necessarily remain a variable quantity for some time yet. No standard form of section for treads and flanges can be determined upon which does not involve the question of conical or cylindrical treads, a problem which the experience of fifty years of railroading has not been able to solve. Then there is the form of flange-throat curves, which should be made to conform to the curves of the rail-head corners. But as there are at present all sorts of rail sections as well as of flange curves, and cars of forty different roads running over the same road, it is a mere chance if the wheels and rails in any case happen to fit one another. It would seem that a standard rail-head should first be established before there can be a standard for treads and flanges of wheels. To reconcile the different views and interests in which these diversities in practice have originated and are maintained, is certainly no easy matter. The committee can hardly be expected to do it, but it can report something definite touching some of the points which have been so much discussed, and leave the Association and the roads it represents to concur with what is recommended or not, as may be deemed expedient.

2. A standard freight car truck. This subject has assumed a shape sufficiently definite to give promise of some definite result at the next meeting of the Association. Whether a standard shall or shall not be recommended is not left to the option of the committee, but they are positively instructed to decide upon a truck which they can recommend; and in order to relieve the committee from any embarrassment in regard to sundry controverted points in construction, some specific conditions are prescribed by the Association to which the truck to be recommended must conform. It must be adapted to cars of 40,000 pounds capacity, have the diamond form, a 5-foot wheel base, "M. C. B." standard axles, journal bearings and journal boxes, and have cross channels so as to be used with rigid or swinging bolsters. This will simplify the action of the committee very considerably. While these points remained undetermined, as has been the case heretofore, every thing was at sea, and committees who took the subject in hand were bewildered and perplexed in their efforts to devise something that would be adapted to all present and future contingencies, in respect to weight of car loads and speed of trains. It is something gained to get the problem narrowed down to a definite maximum car load as a basis upon which to work. With this, and the other conditions named, the committee should be able to recommend a standard truck, and a good one too, at the next annual meeting. But it should be no discouragement to their efforts to say, that ideal perfection is not and never will be a characteristic of freight car trucks, and that the standard which they are expected to report next June, will not, in all probability, be so complete and faultless as to suit everybody or forestall all possible improvements. Let the committee present a standard which they can recommend with some approach to unanimity, and the Association will be compelled to act upon it in a way that will soon determine whether any standard truck for cars of the capacity named is likely to be recommended by it for adoption by the roads. The discussion of the subject has reached a stage at which further procrastination is equivalent to an admission that such a thing as a standard freight car truck is impracticable.

3. Brake shoes, brake beams, etc. The need of interchangeable forms and patterns has frequently been discussed at the annual meetings, and two years ago the committee on the subject recommended the adoption of the so-called "Christie" shoe, but nothing came of it. The next report, made last June, was a mere summary of replies to questions sent out by the committee, showing great diversity of opinion upon nearly all the points in regard to which information was desired. Upon such data the committee could, of course, make no specific recommendations, but only call attention to the importance of the subject. The committee, this year, is instructed to report a definite form of brake shoe, brake beam, and of interchangeable parts, for adoption at the annual meeting next June. If the committee obey instructions, which of course they are bound to do, their forthcoming report will be essentially different from the last one.

4. A standard house-car to carry 60,000 pounds of lading. As a car of this increased capacity is likely to necessitate some important changes in construction, both in running gear and body, the former committee on the subject has been united with the former committee on framing and trussing, with instructions to report definite forms for these particular features for adoption at the next meeting. At the meeting last June, the 60,000 pounds house-car committee reported progress, and as a partial result, exhibited three completed cars which were apparently so well designed and constructed as to be proof against any serious adverse criticism. The committee, however, say in their report that the work before them is only just begun. This we can well believe. If it is so difficult to determine upon the proper construction of a standard truck for 40,000-pound cars, and for which the Association has voted that the present standard axle is large enough, it must be still more difficult to determine just what dimensions of axles, wheels, and other parts, are required for trucks that are to carry 20,000 pounds additional load. In view of the more pressing need of a standard truck for the great number of cars of the lesser maximum capacity (40,000 lbs.) now in use, the committee on the 60,000 pounds house-car, which, of course, comprises running gear as well as body framing and trussing, can well take their time, because they have the biggest job in hand, the early completion of which is not so urgent.

5. Standard dead-blocks. In regard to these appendages, railway men are very much divided in opinion, the majority apparently being in favor of double blocks in preference to single ones. At the meeting of the Association in Philadelphia two years ago, a double standard or compromise was adopted by prescribing the dimensions of both single and double blocks, so the former would not dovetail with the latter when brought in contact. The following year these dimensions were slightly modified, and the committee now in charge of the subject are directed to submit detailed drawings to be adopted as standards at the meeting next June. As we understand it, no attempt is to be made to establish a universal standard, which, under the circumstances, would seem to be impracticable, but merely to define more clearly the dimensions of single and double blocks, so as to secure, as far as possible, the peculiar advantages claimed for each.

The above being the most important subjects to be acted upon at the coming convention, we need not refer to the other committees in the list. It should be noted that in respect to standards, the committees are to report in accordance with certain definite instructions which can not well be evaded, and the six months which intervene between now and next June will have to be improved to the utmost to get things in shape for the important action which must then be taken. According to all indications, the next meeting of the Association will attract the attention of railway men to a greater extent than any previous meeting has done. It will not be a gathering merely in conformity with usage, like some of the meetings that were held ten or a dozen years ago, a sort of annual reunion for the exchange of ideas in a semi-social way. A crisis has come which means business, and it remains to be seen whether the Association under its present efficient organization is equal to the emergency.

THE DRYING OF TIMBER.

Some twenty years ago, the firm of John Stephenson & Co., of New York, who were then as now engaged in the building of street cars, had an experience in the drying of timber, some of the details of which may be of interest to our readers, and especially to car-builders.

During the early part of the war, the concern was engaged almost exclusively in the manufacture of gun carriages, limbers, etc., for the government. For this purpose it was necessary to have dry oak timber of the best description, a large stock of which was usually kept on hand by the government for this kind of work. This was necessary, because the thickness required was some nine inches, and it was out of the question to obtain the dimensions in the open market. The government supply, owing to the excessive demand, was exhausted in a very short time. The large size of the sticks made it out of the question to think of seasoning it in the ordinary way, and no dry stock was available. The proposition to use the timber in a green state was not entertained for a moment by the officers in charge, and hence it became necessary to devise some method of seasoning that should be quick, and an apparatus which should be able to handle a considerable quantity of it in a short time. The plan which was suggested was the application of dry steam in direct contact with the wood. Furnaces were at once erected and preparations made for the work. When the lumber first came from the furnaces it was as bright and handsome as could be desired. The external surface was perfect. The seasoning, however, had evidently gone on in a way very different from that of ordinary air-dried lumber. Pieces which were rectangular in section became to a certain extent, hour-glass shape, measuring less in diameter at the center, on the sides, than at the corners. Air-dried timber, on the contrary, measured more at the centers than the corners, the surfaces being all convex instead of concave, as was found to be the case with the steam-dried timber. This showed that the drying had taken place from the centre. The steam was used at a pressure of 250 pounds per square inch. On opening the sticks the timber was found to have been completely ruined. The whole interior had been practically converted into charcoal, so that it could be crumbled in the fingers, and was of a brownish black color. Even so small a stick as an army wagon spoke would have its centre portion so destroyed as to leave cracks of ¼ of an inch running through it, while the surface exposed to the direct contact of the steam was apparently bright and sound. This, of course, put an end to all attempts to dry the oak by the use of high-pressure steam, and they finally adopted a heat of about 150° Fahr. as a maximum. With this they were enabled in three or four days to remove 400 pounds of water from a ton of green oak.

An idea has been generally prevalent that lumber dried by artificial heat loses something of its strength by the process. Just what this loss is, or how it affected the lumber, is not so generally known. The experiment detailed, however, shows that it is a carbonizing process, which can go on at low temperatures, and this harmonizes completely with Count Rumford's experiments. He succeeded in completely charring thin shavings of beech wood with a temperature, we believe, below 212 degrees. We have seen portions of the pine finish of the Hudson River steamer "Drew," which had been charred, and seemed to be on the point of ignition by the heat of the steam-heating pipes from the boiler. As this vessel carries not over 30 pounds of steam, the temperature must have been less than 251 degrees.

In Mr. Stephenson's establishment, at the present time, the practice is to thoroughly air-dry all lumber used, and then, after the stuff has been worked nearly to its finished form, it is placed a short time in a drying-room heated to 150°, where the surface moisture which it may have acquired is removed, and drying is carried beyond the point to which it can be carried by atmospheric influences alone. This is also the practice in the best wheel-making establishments, the object being to dry the wood when it is put together beyond the point which can be reached by air-drying.

HEAVY FREIGHT LOCOMOTIVES.

Among master mechanics in this country there is a strong feeling against the use of either Mogul 10-wheelers or Consolidation engines. This feeling is especially prevalent among those who are connected with level, or comparatively level roads. The ground for the objection is almost invariably based on the great weight of these engines, and the consequent injury which they do to the rails and road-bed. It is also held that these engines are too heavy for profitable use in hauling freight trains, as they punish the cars and trains more severely than the ordinary freight engines with four drivers do. It is also claimed that the cost for repairs is much heavier than on four-wheeled engines, both on the basis of the engine mile as well as the car mile of haulage. Many engineers go so far in their condemnation as to affirm that in a comparatively short time these heavy engines will disappear from all level roads and only be used on those where heavy grades make them indispensable. They hold that on level roads the lighter 8-wheeled engines will haul as long and heavy trains as it is economical to handle, and that unless cars are built vastly stronger than they are at present, these heavy engines will perform such feats of wrecking that the most enthusiastic of their adherents will be convinced.

While there is much sound argument in all this, there is some danger that confusion will arise from misapprehending facts. It is common to speak of the weights of the engines, and the weights which they have on their drivers, as if they were one and the same thing. A light engine is generally spoken of as one that will be light on the rails, and a heavy one as severe on the rails. While this is often the case, it is not invariably so. The weight per wheel is frequently of more consequence in determining the wear of the rail than the whole weight of the engine. Taking the weight per wheel as a basis for estimating wear of rails we shall find that some of the ordinary 8-wheel passenger engines with four drivers are heavier than any of the objectionable consolidations. Some of the locomotive shops of the country turn out passenger engines that have as high as 12,000 or 13,000 pounds per wheel. Several of the leading railroads build engines that have even more than this on each driver, and no complaints are made in regard to them. One master mechanic who finds fault in regard to the weight of the Moguls, acknowledges building four-coupled 8-wheelers that have considerably more weight on each wheel than the highest of these figures. Here is evidently a case where the total weight of the engine has been taken as representing the weight on the individual drivers.

The heaviest Consolidation engines used on any of the roads east of the Rocky Mountains, do not have, so far as we can learn, weights exceeding 13,000 pounds per wheel, while some of them do not exceed 9,920 pounds, which is less than that of any but the very lightest "American" engines. In order to get at the average practice in these 6 and 8 coupled engines, some figures may be useful. On the Philadelphia and Reading road, Mr. Wootten's heaviest Consolidation engine, of which details are at hand, has a weight of 11,300 pounds per wheel. The New York, West Shore & Buffalo has a large number of Consolidation engines. These have only 11,000 pounds per wheel, their total weight being 104,000 pounds. On the Lehigh Valley road, Mr. Mitchell's Consolidation engines have about 11,000 pounds per wheel. This is about the weight per wheel which several of the different builders give to their heaviest freight engines where there are more than four drivers. Even Mr. A. J. Stevens' monster engine, with a total weight of 128,000 pounds on its drivers, has but 12,800 on each. The total weights of the Consolidation engines range from less than 100,000 to about 108,000 pounds. The average may perhaps be safely taken at 54 tons.

In designing these engines the reasoning was simple. Four wheels, with the weight on them that practice had shown to be perfectly safe, were found to be incapable of doing the work required. Adding another pair of wheels, carrying the same load as the others, would increase the

adhesion by one half. When this was found insufficient, still another pair was added, and the adhesion doubled, but the load per wheel remained the same. It is held by those who favor this type of engine, that so long as the weight per wheel has not been increased, there will be no more punishment of the rails than would occur from the passage of the same number of drivers in American engines over them. Evidently the wear and tear due to the weight of the wheel on the rail will be the same in one case as the other. Those who favor the heavy engines claim that they have proved their case, for these engines are much lighter as a rule than the more powerful passenger engines in common use. These large engines of the American type are accepted, without a protest, by most master mechanics as inevitable. What these engines are can best be seen by examining some of the figures. On the Pennsylvania road, class "K" has 13,900 pounds on each driver, with a total weight of 80,000 pounds. The standard engine of the Louisville & Nashville road weighs 91,000 pounds and has 14,750 pounds on each driver. This is more than that on any heavy freight engine that has yet been reported. One of the latest passenger engines built this year has nearly 22,000 pounds per wheel, and no great objection has been made on account of it. Evidently, those who object to the 6 and 8 coupled engines, on account of the excessive weight per wheel, are laboring under a mistake, since most of the Consolidations are lighter per wheel than the fast express engines in common use. To some extent their arguments have suffered on this account, for it was easily seen that the basis was a mistaken one.

The objections to these engines with a large number of coupled wheels, must be looked for in the weight per foot of track, and in the effect that the long rigid wheel-base has in spreading the rails, destroying the road-bed and throwing undue strains on the bridges. The concentrated weight on the track of the two classes of engines, or the weight per running foot, is not so different as might at first be supposed. The larger engines show weights of from 6,300 to 6,500 pounds per foot of rigid wheel-base. The American type is, however, not very far below these figures, the average being about 1,000 pounds less in the heavier kinds. The largest passenger engine, in the catalogue of the Baldwin Locomotive Works, considerably exceeds the weight per foot of any engine of the Consolidation pattern, of which figures have been given.

It would seem that the strongest objections are to be found in the treatment of the track, the cars, and the machinery of the engine itself. It is affirmed that the lighter pressure of each individual wheel on the rail does not make up for the rigidity of the long wheel base, and that there is no compensation for the hammer of the heavy counterbalance weights which are necessary with the enormous reciprocating parts. As the speeds of the freight trains have been increased, it is found that the wear and tear is increased out of all proportion, and men cannot give their engines the proper attention to make them run cool. On some roads these Consolidation engines have been found to be capable of taking trains so long that they are entirely unmanageable in fogs, sleet, rain, at night, or where the road was very crooked. The rear of the train was so far away from the engineer that the signals could not be observed, and even when seen the weight of the train was so great that it was impossible to stop with certainty. This has resulted in cutting down the trains to such lengths as can be safely handled. In these long trains the cars suffer from excessive shocks, draw-timbers are pulled out in starting, and the trains are broken in two on the slightest provocation. This breaking in two is recognized and acknowledged even by the most enthusiastic advocates of large engines. Jocosely, among the boys they are known as "hogs," because in the matter of putting on cars they will always "take all they can get." When a "hog" starts, something must come, the train must start, the couplings break or draw-bars be pulled out. In the East Buffalo yards these Consolidation switching engines empty the longest switches at a single pull, regardless of the effects on the cars. The results to those of weak construction can be easily imagined. The question resolves itself into which is cheaper, to destroy the cars and pull long trains with single crews, or to use lighter engines, haul smaller trains, treat the cars more carefully and increase the expense of the train crews. From the stand-point of the master mechanic and master car-builder, it is much better to do the work with a little more care and not destroy so much property for the sake of a saving which to some minds seems problematical. It is well to bear in mind, however, that the general tendency of American locomotive practice has been from the first towards heavier engines. Since the time of the "Best Friend" there has not been a year in which the average weight of the locomotives in this country has not been greater than in any previous year. The tendency has constantly been towards greater carrying capacity of cars and greater hauling power of engines. The question then is whether the limit has been reached.

It is fortunate for both the car-builder and the master mechanic that the responsibility does not rest upon them, and that if a mistake is made in the employment of too heavy rolling stock they will not be blamed. They can get much comfort from the remark of one of our oldest and most practical master mechanics, which has a certain lesson for the master car-builder. He said, when speaking of the classes of engines he used, "My superior officers called upon me to do a certain work. I explained the difficulties in the way and the disadvantages which would follow. I put the question before them in all the different lights. They considered what I had said and still demanded that it should be done. I then built the engines which would do what they wanted done. It was none of my business if they pulled their tracks off from the face of the earth. I proposed to do the work required and I did it."

BLACK-LISTING EMPLOYES.

At the meeting of the Association of American Railroad Superintendents, in Boston, a few weeks ago, a committee on employment of men for responsible positions, unanimously recommended the adoption of the following resolutions:

"*Resolved*, That whenever any employé of any road represented in this Association shall be discharged by reason of such violation of orders or regulations or failures to comply with the same as shall be considered by the Superintendent of such road as of sufficient importance to do so, he shall notify by circular letter the fact of his discharge, giving the name of the party, the position he occupied, and the reason for the discharge.

"*Resolved*, That in the employment of men who shall have come from other roads, it is the sense of this meeting that no engagement shall be made unless or until the applicant shall procure a letter from the Superintendent of such road bearing a date not more than 30 days prior to such application for employment, indorsing such applicant as a suitable man for the service he proposed to perform."

It does not appear from the official report, as published, that any definite action was taken on these resolutions. It is our impression, however, that at a previous meeting of the Association a resolution of similar tenor was adopted, and is now or has been in force upon the roads represented in the organization. We do not know to what extent the system has been or is likely to be carried out in practice, but if it is rigorously enforced, the association has hit upon a very effective means of protecting the roads embraced in it against incompetent and untrustworthy servants. If this were all, there would be no occasion for complaint. But a very little reflection must make it clear that such a method is liable to flagrant abuse in more ways than we shall here attempt to point out. As there are two distinct interests involved, the matter should be looked at from two points of view, viz., from the superintendents' stand-point and the employes' stand-point. On one side there is unrestricted authority, and on the other absolute helplessness. If the weaker party is wronged there is no appeal by which the wrong can be rectified. This is at war with all fundamental ideas of justice. Even if every railway superintendent were conscientiously careful to guard against the possibility of making any mistake in sending out circular letters of the kind indicated, the propriety of such a proceeding would be open to very serious question. Is every employé who is discharged in railway business or any other business for alleged dishonesty, negligence or incompetence, such an utter outcast from his chosen occupation that he must be forever debarred from entering it again? And are all railway superintendents so perfectly upright and scrupulous that the rights of employés are always safe in their hands? As practical business men, charged with grave responsibilites, they are, as a class, second to no other in ability and good intentions, but no class of men is so good or so exempt from moral or mental infirmity, as to be intrusted with the exercise of arbitrary power over an inferior class.

Unfaithful or incompetent men can not, of course, be retained in railway service without endangering life and property, and it is the imperative duty of superintendents to discharge such men upon evidence that may be deemed sufficient. In a vast number of cases the superintendent has no personal knowledge of the facts alleged, but relies upon the representations of subordinates, which may or may not be true. The employé who is discharged, whether justly or unjustly, is practically tried, convicted and sentenced by a party who assumes the functions of both judge and jury, and allows no appeal. And behind this procedure is an organized combination, powerful in itself, which can black-list those who are adjudged guilty, by the sending of circular letters to as many roads as may be included in the association. The action of the superintendents in this matter should be reconsidered, and modified so as to be more in accord with American ideas of personal liberty, justice and fair play.

COLOR DECORATION FOR CARS.

It is probable that very few car-builders fully appreciate the difficulties encountered by painters and decorators in obtaining color harmonies on the inside of cars finished in natural woods, nor do they perceive why striking and brilliant results are so rarely obtained on veneer head-linings. It is doubtful whether master car-painters themselves understand very clearly the reason of their inability to do such work as they would like to do it. The primary reason cannot, perhaps, be better defined than by saying that it exists in the eternal nature of things, and cannot be set aside or disregarded.

There are three, and only three, primary colors, and these, when of equal intensity, balance each other in certain definite proportions. They also enter into combination with other colors in the same proportions. According to Dr. Christopher Dresser, who is very good authority in color analysis, the primaries, yellow, red and blue, bear the relation to each other of three, five and eight respectively, and if they are of similar intensity these numbers will represent square inches of surface required for harmony, but if they are of different degrees of intensity the numbers may be considered as representing such difference. The strength and effectiveness with which yellow asserts itself is fully recognized in striping, and in many other details of decoration it appears to be nearly as powerful as white. In combination also its power is equally felt, and unless it is judiciously used it may easily be made to destroy or very much impair the effect of other colors in contrast with it.

Red is a powerful color, and according to the above analysis, it bears the relation of five to three as compared with the yellow, while blue is as eight to three, equal spaces of pure blue having only three-eighths as much power as an equally pure yellow.

The next thing to be considered is, that whatever is to be used as a groundwork must be a subordinate element in decoration or coloring. It is needless to mention examples. The principle is too well established to be disputed. When, therefore, we find that nearly all the natural woods used for head-linings are more or less yellow in color, and become deeper yellows by age, the difficulty of putting suitable colored ornaments upon them is evident. The yellow is almost invariably so decided as to overcome any color which may be placed upon it, unless the quantity of such color is increased out of all proportion. It would be easy, if the yellow were faint, to make the blue or the red tones sufficiently strong to overmaster it and thus obtain such a balance of color as might be desired. Unfortunately, yellow in itself is the lightest of the primary colors, and when diluted with white, as may be said to be the case in natural woods, loses but very little of its power.

There are two courses open for the decorator. The first is one which has been but rarely tried, but its success warrants the hope that it may be used somewhat more extensively than it has been. It is the staining of the wood, as maple, ash or oak, evenly so as to change the color from yellow to a grayish blue, pale red or an olive green. Any one of these tints is easily obtained without destroying the beauty of the wood pattern. With either of these for a background the artist finds little difficulty in working up fine results in color. The second plan is one which has been very effectively employed in a number of establishments, and that is, not to attempt a scheme of color, but really to make what may be termed a harmonious combination of brown and wood colors with the wood itself.

WE print on another page a lengthy communication from Mr. M. N. Forney on the adoption of standards by the Car Builders' Association, and suggesting additional methods for increasing the efficiency of the organization. Mr. Forney's long connection with its membership, his present position as its Secretary, and his untiring efforts in perfecting the recent reorganization of the Association, entitle his views to the careful consideration of every one who is interested in promoting its usefulness. We do not feel called upon to make any comments upon what he says, except as touching one or two points in which he takes exception to some recently expressed views in these columns.

In our last issue, in an article on the subject of standards, we took the ground that under the voluntary system, which leaves every road to do as it pleases, local standards are the only ones that are practicable. The term "local" is of course somewhat indefinite, but it is understood to mean what are called road standards, or standards identified with particular roads or systems of roads, with no marked tendency to become universal. While Mr. Forney questions the correctness of our opinion that such standards are the only ones that are practicable, he admits that under the voluntary system, universal standards in car construction, or such as will be adopted and used upon all the roads, are impossible; but that the more the use of such standards is extended the more the evils of diversity will be lessened. In this view of the matter we fully concur, and we also think that the Car Builders' Association has already done a great deal, and is likely to do much more, to lessen the existing variety of local standards. But we very much doubt whether it can do more than this.

We also stated in our last issue that the Association passed a resolution last June asking railway companies to defray the expenses of making tests of car couplers, and that, so far as we were informed, the resolution was not likely to be prolific of results. This, it seems, was both accurate and inaccurate. The resolution instructed the Executive Committee to issue circulars asking the companies to signify their willingness to pay such expenses, which seems to us equivalent to about the same thing as asking them to pay. We assumed that the Committee was the working instrument of the Association, created by it and existing inside and not outside of it. But it seems that the circulars have not yet been issued as the Association instructed them to be, and consequently the companies have not yet been formally asked. Not being aware of this until informed of it in Mr. Forney's communication, we of course stand corrected.

International Inventions Exhibition in London.

We call attention to the announcement of this exhibition in our advertising columns. It will be opened on the 1st of May, 1885, and will be continued for about six months. The exhibits will be comprised in two grand divisions, the first including a wide range of apparatus, appliances, processes and products invented or brought into use since 1862, and the second consisting of examples of musical instruments and machinery and appliances connected with their manufacture.

The collection of inventions will doubtless be the most attractive feature, and will be classified in thirty-one groups, including machine tools and machinery, engineering construction and architecture, prime motors and means of distributing their power, railway plant, electrical apparatus, photography, etc., etc., the object being to present a practical realization of the progress which has been made during the last quarter of a century in applying the discoveries of science to the purposes of daily life. In view of the fertility of American genius in the field of invention, it hardly need be said that the opportunity afforded by this exhibition will be improved by a host of inventors on this side the water to bring their inventions to the notice of Europeans and to compete with those of a similar class abroad. It is expected, indeed, by the projectors and promoters of the exhibition, including the Queen, the Prince of Wales, and many of the leading scientific men in England, that American inventions will take a prominent place in the first division, as stated above. For this reason, and for the convenience of contributors from the United States, the latest date for the reception of applications for space, has been extended from October 1 to December 31 of the present year. No charge will be made for space. Printed forms of application and all necessary information will be furnished by addressing Mr. Pierrepont Edwards British Consul, New York.

Shop Fire Departments.

The fire organization established at the Oneonta (N. Y.) shops of the Delaware & Hudson Canal Co., by Mr. R C. Blackall, Superintendent of Machinery, is so complete, simple and effective, that some account of it will be interesting to those of our readers who are connected with railway shops, or who are considering the best means for protecting them against fire. There are many shops that are so situated as to make it necessary to have a fire department of their own, distinct from those of towns and cities; in which case there may be some perplexity as to the methods that will insure the best results without too much labor and expense and the intervention of too much red tape. The system adopted by Mr. Blackall, at Oneonta, may be described as follows:

A sufficient number of volunteers for the service are selected from the men who live nearest the shops. These are formed into companies of fifteen men each, there being one company for each hydrant. Each company has a captain and a foreman, the foreman to take command in case the captain is absent or unable to serve. Another man makes the hose and hydrant connections, and sees that they are kept in good condition and in readiness for emergencies. When the whistle sounds an alarm, each man takes the shortest cut to his post. This arrangement insures a hose connection at every hydrant, with men enough to handle it. The water is taken from the town mains, which are supplied from a reservoir on the hills, with a head pressure of 80 pounds to the square inch, or more than sufficient to throw a heavy stream over the highest building on the premises. In the yards and about the shops there are five hydrants, to each of which a company is assigned. These companies are stationed respectively in a new round-house and an old one, the machine shop, carpenters' shop and paint shop. The hose-nozzles vary from ¾ to 1 inch, and even larger sizes are used in washing out. The hydrants are placed so that the streams from them will command all parts of the buildings and also the lumber yards. The method of taking care of the hose is worth attention. It is not put on reels nor coiled, but each length is hung up by the middle from a rope that passes over a pulley. The rope carries a block of wood at the end over which the hose is placed, so that it can be easily taken off and can hang without making too sharp a bend cutting. A loop in the rope is put over a cleat. This has only to be slipped, when the hose will come down on the run. The advantage of this method of storing is, that the hose is always dry and straight, draining at once when hung up, and without any attention. The lengths of hose are hung as near to the hydrants as possible. In the round-house the hose is beside the hydrant. In most of the other cases, the hydrants being out of doors, the hose is hung just inside of the nearest door. In case of an alarm at night, the watchman is able to get the hose coupled up as soon as the men are on the ground. In each room of all the buildings there are bell-pulls connecting with the engine room, so that a signal can be given to the engineer from almost any part of the works without having to go more than the width of the building. One ring means that the engine is to be slowed, two rings means stop, three rings is to go ahead, and four rings is for fire, and when this signal is received by the engineer he at once sounds the steam-whistle four times, giving the whole works the fire signal. This system of bell-pulls to the engine room has been found very convenient, and is worth adopting in any shop, without reference to its value in connection with the fire service.

Where an efficient city or town fire department is within reach, it is the opinion of many old firemen that an organization in shops is of comparatively small importance, unless the shops have a water supply of their own and are so far independent of the town or city. The works of the Gilbert Car Mfg. Co., at West Troy, have direct fire alarm connections with two or three steamers on the west side of the river, and they are also connected with the Troy fire department. The city water under high pressure is conveyed all through the works as a first means of protection. In addition to this, the works have a powerful fire-pump connected with the mains, so that in case of accident or breakage an independent supply can be had. There is also a tank with sufficient head to throw a stream over any of the buildings. Here, as in most places in an emergency, a man who has had a fireman's experience is worth as much as an organization. Mr. Gilbert was a member of the old volunteer fire department, and his knowledge thence acquired saved the works in one instance at least from destruction. During a dry time a shed on the windward side took fire from the sparks from locomotives, and the roof was on fire in fifty places, but under very slight headway. It was extinguished before a stream of water could be brought to bear upon it, simply by knocking off the roof boards, and as they fell to the ground the fire was stamped out. Had there not been an experienced man on the ground to give directions, the men would have waited till a stream could have been thrown on the roof. The delay of two or three minutes in doing this would have given the flames sufficient headway, aided by a strong wind, to have made it impossible to save the entire works from destruction.

The Curtis & Wood Automatic Coupler.

The Norristown (Pa.) *Herald*, of Nov. 17, says that this device was tested on the previous Saturday at the works of Mr. John Wood, Jr., at Conshohocken, Pa., in the presence of a number of persons interested in couplers, and with entirely satisfactory results. It was also exhibited at the November meeting of the Car-Builders' Club, in New York. It is of the hook-and-link variety. The hook has a spring follower, and is of extra strength as compared with that of the link. The draw-head is of the ordinary pattern. Instead of a mere link and pin, however, a link and steel hook are used. The latter is 5 inches long, 4 inches wide and 1¼ inches thick, and has a strength five times as great as the ordinary pin. This is placed in a slot, and immediately behind it is a follower 6 inches long and 1¼ inches in diameter, with a powerful spring 4 inches long coiled around it. The steel hook is connected by a chain with a rod worked by the cranks at each side of the car, thus obviating any necessity for going between the cars. When the link is in position, a turning of the crank is sufficient to throw out the link and uncouple the cars. With the link in position in one car it is impossible for another car to strike it, no matter whether moderately or violently, without being coupled. The instant the link strikes the steel hook, the spring gives way sufficiently to admit it to its place, when the hook falls and is kept in place by the spring and follower until a partial turn of the crank uncouples the cars. The device is absolutely self-coupling in any position and with any car that has not a skeleton draw-bar. Aside from the automatic arrangement, the external parts are exactly similar to those in common use, and this coupler can be substituted for the other on any car in an hour. The increased cost is scarcely five per cent. of the cost of the ordinary kinds. It is now in use on the Philadelphia & Reading road, and will be exhibited before the Massachusetts Railroad Commissioners. The coupler is manufactured at the above-named works.

New Publications.

TRAIN ORDERS, RULES AND SIGNALS: A Manual of Reference for Train Dispatchers, Conductors, Engineers, Brakemen, Operators, Station Agents and Yard Masters. By Isaac H. McEwen. Published by *The Railroad Herald*, Buffalo, N. Y.

The author has embodied in this pamphlet of 68 pages the results of his experience for fifteen years as a railroad employé in various capacities connected with the running of trains. The diversity in the rules of different roads, the defects peculiar to each code, and the danger of a loose adherence to rules imperfectly understood by employés who have been accustomed to different codes, are dwelt upon as showing the necessity of a more uniform standard for all roads. To this end the author has formulated a set of rules containing some valuable ones not found elsewhere, and comprising altogether a system which he deems applicable to all contingencies incidental to the movement of cars and engines whereby life and property may be jeopardized. A code of signals is also given, a statement of the duties of conductors, engineers, brakemen and others, and various other matters relating to train service in its many details. The work is designed as a handy and instructive reference book for the benefit of the classes of railway employés named in its title, although in respect to rules and signals it does not relate exclusively to the practice of any particular road.

THE NECESSITY FOR A CLASSIFICATION OF FREIGHT, AND THE PRINCIPLES UPON WHICH IT IS BASED. By Edward P. Vining, Commissioner Western Trunk Line Association.

This little pamphlet of ten pages (reprinted from the *Railway Review*) unfolds the elementary principles which underlie the business of freight transportation, and will do much toward placing this intricate subject in a clear light to those who give the writer's views a careful perusal. It is a subject that cannot be too well understood by shippers, as a class, nor by the business community generally, among whom so much misapprehension and so many erroneous impressions exist. The author deals with it from the stand-point of practical experience, and sets forth the principles which must necessarily govern in respect to rate discrimination, classification, etc., in order that justice may be done to both shippers and carriers.

Railway Cars in India.

The first-class carriages are divided into two compartments, the lavatories being in the center. On the floor of each compartment there are three comfortable sofas in leather work, the backs of which can be pulled out and raised, giving three more of what may be called upper berths. There is a double roof to intercept the heat, and over the windows is a projecting hood for the sake of shade, and each window has a latticed sash in addition to a sash of clouded glass. To promote coolness there is a perforated false floor, with a layer of matting underneath kept constantly irrigated from a water tank in the roof. The sun's heat in the daytime is strong but not oppressive, and at night the temperature gets so low that the traveler would be uncomfortably cold without wraps and extra clothing. The family carriages on the East Indian roads are saloon shaped, with a table in the center, a bath room at one end, and at the other a narrow compartment for servants, from which the punkah, or fan, so indispensable to comfort in hot weather, may be worked. The first-class carriages are almost invariably occupied only by Europeans; the second class are airy and comfortable, and are chiefly used by civilians and soldiers; and the third class are almost wholly given over to the natives, who seldom sit on the seats, but use them as a kind of perch. There are also third class carriages set apart for women, in which may be seen a rare show of dusky but not always uncomely faces, bright eyes, nose-rings sparkling with stones, which, if they are not quite real gems, look nearly as well, massive ear-rings, great silver bracelets, and bangles which clink with every movement of the ankles they are intended to adorn.

THE Cummer Engine Co. report that the Jonathan Mills Flour Dresser manufactured by them is meeting with excellent success. They are selling a great many of them and are receiving a large number of repeated orders. They are also quietly placing a number of the "Finch" Rolls, which are looked upon by all who have investigated them as a very superior roll. The company have also just been awarded the contract for the Refrigerating Plant for the Brewery of Rothaker Bros. & Thomas, of Philadelphia. This comprises two of their refrigerator machines, two condensers, etc. They have also entered into contract with Henry Zeltner, of Morrisania, N. Y., for a large Refrigerating Plant, including two machines, two condensers, one of their 67 h. p. engines, etc., and have received an order for an engine of the same size from the Montgomery Milling Co., Montgomery, Mo. Among the recent shipments of the company are the following: A 95 h. p. engine for the Flouring Mills of Amos Bros., Syracuse, N. Y.; 2 engines, 67 h. p. each, for the Citizens' El. Co., of Akron, O.; one 120 h. p. engine for the Upton Mfg. Co., Port Huron, Mich.; one 170 h. p. engine for the Cotton Mills of Hadley & Co., Holyoke, Mass.; one 287 h. p. engine for the Frankfort shops of the New York, West Shore & Buffalo road; and one 170 h. p. engine for the Cotton Mills of W. H. Cherry & Co., Mountain Mills, Ala.

THE KING VARNISH CO., of Akron, O., having secured the services of the head varnish maker of the late Forest City Varnish Co., of Cleveland, are now in a position to furnish the above company's late customers with the same grade of goods they formerly purchased and made after the same formulas. The old force of The King Varnish Co. will be retained, and they will continue to manufacture their standard grade of goods which have pleased their customers and have built up for them a large and rapidly increasing trade. The formulas of the late Forest City Varnish Co. having been transferred to this company and none other, they alone can with certainty supply the same grade of goods the late Forest City Varnish Co. formerly sold. We take pleasure in referring the customers of the late Forest City Varnish Co. to The King Varnish Co. of Akron, and assure them they will be dealt with fairly and honorably.

THE United States Wire Nail Works, of Indianapolis, Ind., manufacture barbed nails of the various kinds and sizes specially adapted to car-building purposes. The works are very busy and have orders in hand for sixty days in advance.

THE New England Car Spring Co., of Boston, has been purchased by Mr. Fred. J. Kaldenberg, of New York, who will continue the manufacture of rubber springs in the last named city. Office, 125 Fulton street.

THE Detroit *Free Press*, of Nov. 16, says: "The proprietors of the Detroit Steel and Spring Works contemplate the erection of another building in the rear of the present works corner of Michigan and Indian avenues. The steel springs manufactured at this establishment are gaining a national reputation for their superiority. It will be necessary to remove a number of cottages to make room for the new building."

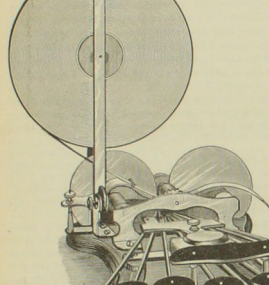
THE Eames Vacuum Brake Company has been reorganized by the choice of John C. Thompson, of Boston, as President; James H. Slade, of Boston, as Vice President and Secretary, and George B. Massey, of Watertown, as Treasurer. Mr. Elisha D. Eames continues with the company as superintendent of the factory at Watertown, N. Y., and as a member of the Board of Directors. On and after Dec. 1 the main office of the company will be located at 123 Oliver street, Boston, Mass., to which address correspondence and orders should be sent. L. G. Tillotson & Co., of New York, are general sales agents for the company in the United States exclusive of New England, and Mr. George F. Cochnower, 15 Oliver street, Boston, is general sales agent for the New England States and Canada.

THE Diamond State Car Spring Co., Wilmington, Del., have chosen the following directors for the ensuing year: N. H. Davis, L. C. Gratz and Wm. P. Hirons. Since Mr. Walton left the employ of the company extensive repairs and improvements have been made to the works in expectation of the coming pressure of business.

The Stenograph System of Shorthand Writing.

A year ago we published a brief article in reference to the advantages of stenography and type-writing in expediting the clerical work in car-builders' offices, and made incidental allusion to a new system of mechanical stenographic writing which promised well, and which we proposed to investigate and give the results at some future time, which we now do.

The new system is a shorthand writing machine called the "Stenograph," the general appearance of which is shown in the engraving. Its total weight is 3½ lbs., and it occupies a space a little less each way than 8 by 8 inches. There are ten rubber finger-pieces or keys, one for each of the fingers of each hand, a double or wide one for the thumbs, and a still wider one on the opposite side for making spaces. The keys operate five hammers, each one of which when struck makes a short dash upon the ribbon of paper. Struck all at once, a line of dashes extending nearly across the paper would be made. Combinations of these dashes form the letters. These may be struck indiscriminately with either hand at one stroke. By taking the dashes from one to four at a time, enough distinct letters are obtained to make a full alphabet, and three frequently used phonographic letters at the same time. The accompanying alphabet, with the dots as they appear upon the paper, will make the theory of the alphabet simple. As each key, or combination of keys, is struck, the paper is moved a short distance as well as the ink-ribbon. The machine, in this respect, is arranged somewhat upon the principle of the type-writer.



Last year, when this machine was presented as a substitute for stenographic writing with the pen, the claim was made that the instrument made successful shorthand writing a certainty to any intelligent person willing to devote a few weeks of study or practice either with or without a teacher. A claim so remarkable as this naturally called for careful investigation. As many of our readers know, ordinary shorthand is not a system which can be successfully acquired by every one within a reasonable length of time. Peculiar mental qualities are needed in order to enable the student to master stenography and use it with facility and accuracy. A great many clerks in our railway offices have undertaken to learn shorthand, either at their own desire or that of their superior officers, and have been discouraged by the immense amount of labor necessary in order to make it practically useful. Some, indeed, have gone so far as to adopt abbreviated longhand for the purpose of taking notes, and depending upon their memory to fill out and complete their notes. Before a thorough manual for the machine had been elaborated, we put it in the hands of a person with the intention of testing its capabilities. We selected one whose skill with the fingers was exceptionally moderate, as we did not wish to give the machine any advantage from the special adaptation of the operator who used it. A speed fully equal to that of longhand was attained in what was equivalent to the practice of one hour a day for two months. Another month of similar practice brought the speed up to 70 or 80 words per minute. After this, interruptions took place which made it difficult to estimate the time expended or the speed gained. We have tried other students, however, who had been using the machine for about three months, and found the speed to be considerably over 100 words per minute. Even this, which is the rate attained by a novice, is practically sufficient for any ordinary reporting in an office.

Having decided the question that the machine was capable, even in ordinary hands, of writing rapidly and with a short period of study, the question arises: What advantage has it over the ordinary stenographic system? Foremost, we should place the fact that the signs are invariable and definite. The number of word signs is small, numbering about 75. These two facts result in a certainty in the system which, to those familiar with ordinary stenography, is surprising: A diligent student who writes down all the exercises taken down by the stenograph will, as soon as he is able to write 25, 50 or 75 words per minute, be able to accurately copy or read what he has written, and what he has acquired will be practically useful. This is more than can be said of any system of stenography with which we are acquainted. The definiteness with which the reading can be done is quite as great an advantage as the simplicity of the machine or the ease with which the system can be acquired. In technical work, like the dictation in a car-builder's office, this is an all important feature, and to students who propose to give the system a trial we would say, by all means make reading one of the prominent features of study. It is really quite as important as speed; for without it speed even if it be 150 or 200 words per minute, would be entirely valueless.

Machines with the manual cost, without instruction, $40. Where instruction is given the price is $10 additional. The agent, Mr. Frank W. Ganse, 36 East 14th street, New York, has a school where instruction to purchasers is given and facilities provided for study, practice, etc. To one who proposes learning the system, we would recommend the purchase of a machine and a careful practice, following the directions in the manual. Upon one thing we should insist most strenuously, and that is to avoid haste in learning and more especially in acquiring speed. Those who are naturally skillful with the fingers, and who, by piano or other similar practice, have attained facility in using them, will be prone to attempt fast writing before they have thoroughly mastered the principles of the system. This is a mistake, for with a vast majority of people the greatest drawbacks to speed will come from mental and not from mechanical peculiarities. Experienced stenographers find, when they are pushed to their utmost, that there is a constant tendency to revert to the longer and more complex forms, and that the better ones learned later in their study are the last ones which occur to them, showing that the mental part of the work is slowest, and that the fingers learn more rapidly than the brain. The student, therefore, should establish himself thoroughly in the system before making any attempt to push the speed of his writing. Lastly, every sentence that is written on the machine should be copied either in longhand or on the type-writer. A careful observance of this rule will more than offset the difficulties met with in adhering to it.

How long it takes to acquire a speed of from 100 to 125 words per minute, we cannot state definitely from experience, though teachers in the schools estimate the time at from six to ten weeks, with a practice from dictation of at least one hour per day.

The method of spelling is phonetic, and a large number of words are abbreviated by the omission of vowels. Those who have at school been in the habit of analyzing the sounds of words, or have given even a brief study to phonography, will experience no difficulty here.

The conclusion which we reach is, that the machine opens a means for speedy writing to a great number of persons who could not learn phonography, and that it possesses material advantages over other stenographic systems in its accuracy, even in the hands of the beginner.

THE ALPHABET.

A	- - - -
B	- - - -
C	- - - -
D	- - - -
E	- - - -
F	- - - -
G	- - - -
H	- - - -
I	- - - -
J	- - - -
K	- - - -
L	- - - -
M	- - - -
N	- - - -
O	- - - -
P	- - - -
Q	- - - -
R	- - - -
S	- - - -
T	- - - -
U	- - - -
V	- - - -
W	- - - -
X	- - - -
Y	- - - -
Z	- - - -
th	- - - -
sh	- - - -
ch	- - - -

The Master Car-Builders' Club will hold its next regular meeting at 113 Liberty street, New York, on Thursday evening, Dec. 18. Subject for discussion, "Car Wheels."

The New England Railroad Club will hold its next regular meeting at its rooms in the Boston & Albany station, in Boston, on Wednesday evening, Dec. 17.

The Western Railway Club will hold its next regular meeting at its rooms, 103 Adams street, Chicago, on Wednesday, Dec. 17.

Our Directory.

We note the following changes since our last issue. Our readers will do us a great favor by giving us prompt notice of any changes that may come to their knowledge or of any errors that may be noticed in our list:

Camden & Atlantic.—Joseph Crawford has been appointed Superintendent, vice W. N. Bannard, who has gone to the Pennsylvania road.

Chesapeake & Ohio Southwestern.—Jas. L. Frazier has been appointed Superintendent.

Chicago, St. Louis & Pittsburgh.—Wm. Swanston, in addition to his duties on the Jeffersonville, Madison & Indianapolis road, has been appointed Master Mechanic of the new shops at Indianapolis.

Chicago & Northwestern.—W. H. Stennett has been appointed Assistant to the General Manager.

Illinois Central.—F. W. Baker is appointed Acting Master Mechanic of the Southern Division in place of Mr. E. D. Anderson, who has gone to the Louisville, New Orleans & Texas road.

Kentucky Central.—W. T. Smith has been appointed Master of Machinery at Covington, Ky., in place of A. H. Watts.

Louisville, New Orleans & Texas.—C. J. Birdsong has been appointed Superintendent of the Northern Division from Memphis to Vicksburg.

Missouri Pacific.—Warder Cummings has resigned the position of Superintendent of the Texas & Pacific Division.

New York Central & Hudson River.—Leander Garey has resigned his position as Superintendent of Car Department, to take effect Dec. 31, after which W. Buchanan, Superintendent of Motive Power, will have charge of the Department. Peter Smith, Master Car-Builder of the Hudson River shops, New York, has been transferred to East Rochester, in place of C. H. Burchard deceased. W. H. Wolfrath is the successor of Mr. Smith in New York.

New York, Lake Erie & Western.—The title of S. M. Felton, Jr., Assistant to the President, is changed to General Manager of the New York, Pennsylvania & Ohio road, and as such will have charge of its operation and maintenance. Chas. Neilson, Superintendent of the Buffalo & Rochester Divisions of the Erie, has resigned his position.

New York, Providence & Boston.—J. Augustus Durgin, who succeeded J. A. Anderson as Superintendent of Motive Power, Nov. 1, was killed a few days after his appointment.

Petersburg.—J. R. Woodard has been appointed Master Mechanic.

Southern Pacific.—P. S. Wilson has resigned the position of Master Car Painter and Thomas H. Cornish has been appointed in his place.

Sharpsville.—Thos. M. King has been chosen President and General Manager. He is also General Manager of the Pittsburgh & Western.

Texas & St. Louis.—P. J. Milan has been appointed Master Mechanic, and M. B. Jones Master Car-Builder.

Union Pacific.—Sylvester T. Smith has been appointed General Superintendent. O. H. Brinkerhoff succeeds Mr. Smith as General Superintendent of the Kansas Division. W. S. Waldridge has resigned his position as Superintendent of the Idaho Division, and O. H. Dorrance is appointed Superintendent of the Nebraska Division, vice J. P. Nichols.

Wabash, St. Louis & Pacific.—R. H. Hemphill has resigned his position as Master Car-Builder. R. G. Butler has been appointed Superintendent of the Western Division, vice R. S. Miner.

Wilmington & Weldon and *Wilmington, Columbia & Augusta.*—H. Walters has been appointed General Manager of the Wilmington & Weldon and the Wilmington, Columbia & Augusta railroads, in place of R. R. Bridges, who remains President of the two companies.

THE Annual Report of the Master Car-Builders' Association for 1884 has just been published, but too late for a formal notice in our present issue.

The Century in 1885.—A Great Enterprise—Papers on the Civil War.—The Chief Feature of *The Century Magazine* for the coming year—indeed, perhaps the most important ever undertaken by the magazine—will be a series of separate papers on the great battles of the War for the Union, written by general officers high in command upon both the Federal and the Confederate sides—General Grant (who writes of Vicksburg, Shiloh and other battles), Generals Longstreet, McClellan, Beauregard, Rosecrans, Hill, Admiral Porter and others. The series opens in the November CENTURY with a graphically illustrated article on "The Battle of Bull Run," written by the Confederate General G. T. Beauregard. Brief sketches, entitled "Recollections of a Private," papers chronicling special events, descriptions of various auxiliary branches of the service, etc., will supplement the more important series by the various generals.

A strict regard for accuracy will guide the preparation of the illustrations, for which *The Century* has at its disposal a very large quantity of photographs, drawings, portraits, maps, plans, etc., hitherto unused. The aim is to present in this series, not official reports, but commanding officers' accounts of their plans and operations—interesting personal experiences which will record leading events of the war, and possess at the same time a historical value not easily to be calculated.

Fiction.—In this line *The Century* will maintain its prestige, and furnish the best stories by American writers that can be procured. In November begins a new novel by W. D. Howells, author of "Venetian Days," "A Modern Instance," etc. This story deals with the rise of an American business man. A novel by Henry James, a novelette by Grace Denio Litchfield, and short stories by "Uncle Remus," Frank R. Stockton, H. H. Boyesen, T. A. Janvier, H. H., Julian Hawthorne, and other equally well-known writers will appear at various times.

Miscellaneous Features.—Under this heading may be included a series of papers on the Cities of Italy, by W. D. Howells, the illustrations being reproductions of etchings and drawings by Joseph Pennel; a series on The New Northwest, being an interesting group of papers by E. V. Smalley, Lieut. Schwatka, Principal Grant (of Queen's, Ontario) and others, descriptive of little-known regions; papers on French and American art,—sculpture and painting, with some exquisite illustrations; papers on Astronomy, Architecture and History, the first being by Professors Langley and others. Under Architecture are included more of Mrs Van Rensselaer's articles on Churches, City and Country Houses, etc. Col. George E. Waring, Jr., will describe Progress in Sanitary Draining; E. C. Stedman, Edmund Gosse and others will furnish literary essays; George W. Cable will contribute in various ways; several papers on sport and adventure will soon be published, and John Burroughs will write from time to time on outdoor subjects.

Readers of THE CENTURY *may feel sure of keeping abreast of the times on leading subjects that may properly come within the province of a monthly magazine. Its circulation is now about 140,000 monthly, the November number exceeding that figure. Subscriptions should date from this number, beginning the War Series and Mr. Howells' novel. Price $4.00 a year, 35 cents a number. All booksellers and news-dealers sell it and take subscriptions, or remittance may be made to the publishers.*

A free specimen copy of THE CENTURY will be sent on request. Mention this paper.
THE CENTURY CO., NEW YORK, N. Y.

St. Nicholas for Young Folks, Attractions for 1884-5.—No printed periodical can take the place of parent, pastor, or school-teacher; but a good magazine can supplement their work and influence to a wonderful degree. In view of this, it is not extravagant to say that—in spite of "Can we afford to take it?" ST. NICHOLAS"—"the question of every earnest household in English-speaking countries, to-day, should be "Can we afford *not* to take St. NICHOLAS?"

The magazine, during its eleven happy years of existence, under the editorial charge of

Mary Mapes Dodge, has grown familiar to hundreds of thousands of young readers; and their interest and intelligent enjoyment have constantly inspired the editor and publishers to fresh effort. To-day, its strength is in its wholesome growth, its sympathy with young life, its hearty recognition of the movement of events, and its steadily increasing literary and pictorial resources. The following are some of the good things already secured for future numbers of ST. NICHOLAS:

"His One Fault," a serial story for boys, by the popular author, J. T. Trowbridge.

"Personally Conducted," illustrated papers on famous places in Europe. By Frank R. Stockton.

"Historic Girls," a companion series to "Historic Boys." By E. S. Brooks.

"Ready for Business": suggestions to boys about to choose an occupation, based on personal interviews with prominent representatives of various trades and professions. By Rossiter Johnson.

"Driven Back to Eden," a serial. By E. P. Roe.

"Talks for Young Folks," a series of popular papers, by H. H. (Helen Jackson).

"Among the Law-makers": recollections of a boy-page in the U. S. Senate—containing much political information, both instructive and amusing. By Edmund Alton.

"DAVY and the Goblin," a very funny serial story by a new writer, Chas. Carryl.

Short Stories by Louisa M. Alcott.

"The Progress of Invention": "From Palanquin to Parlor-car," "From Cross-bow to 100-ton Gun," etc. Descriptive papers, by Chas. E. Bolton.

"Art Work for Young Folks": papers on decorative handicraft, by Chas G. Leland.

"Sheep or Silver?" a story of Texan life. By the late Rev. William M. Baker.

"A Garden of Girls," being six short stories for girls, by Six Leading Writers.

"Tales of Two Continents": stories of adventure, by H. H. Boyesen.

"Cartoons for Boys and Girls." Funny pictures by E. Nicholas Artists.

"From Bach to Wagner": brief, pointed biographies of great musicians, by Agatha Tunis.

Special Papers by chosen writers, including Mary Hallock Foote, Joaquin Miller, Alice Wellington Rollins, Harriet Prescott Spofford, Rev. Washington Gladden, Julia Schayer, Anna Lea Merritt, W. O. Stoddard, D. Ker, Ernest Ingersoll, Chas. A. Cleveland, Lieutenant Schwatka.

The illustrations will be the work of the very best artists and engravers—and there will be plenty of them. In the November and December numbers are beautiful colored frontispieces.

Buy the November number for the children. It costs only 25 *cents, and all book and news dealers sell it.* The subscription price is $3.00 a year, and now is just the time to subscribe.

A free specimen copy of ST. NICHOLAS will be sent on request. Mention this paper. THE CENTURY CO., New York, N. Y.

Employment.

WANTED—A position as Master Car-Builder on a railroad, or as Superintendent or Foreman in a contract shop. The applicant has had fifteen years' experience as a master car-builder on one of the leading roads of the country. Address "Como," office of NATIONAL CAR-BUILDER.

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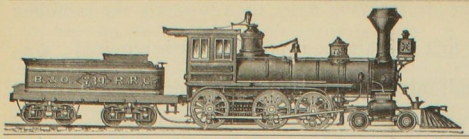

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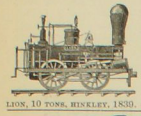

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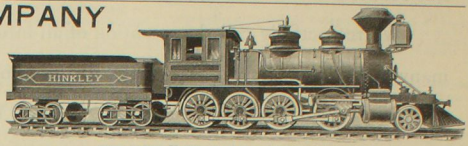

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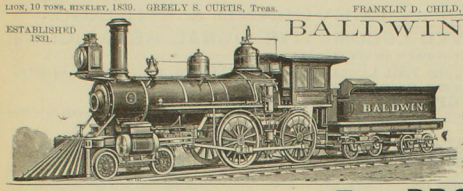

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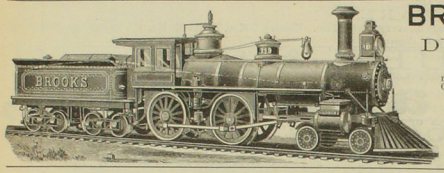

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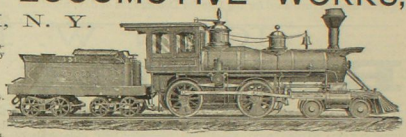

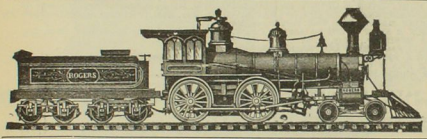

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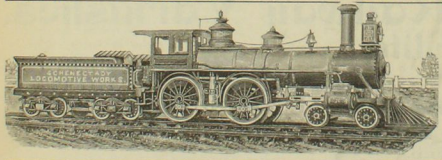

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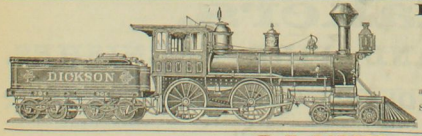

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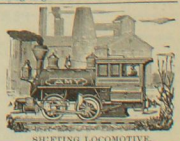

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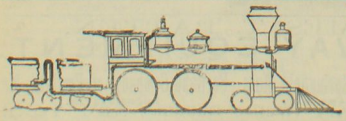

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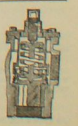

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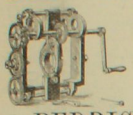

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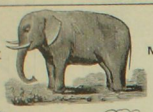

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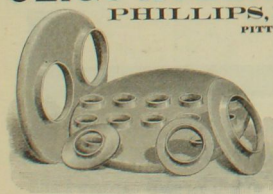

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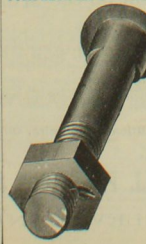

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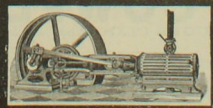

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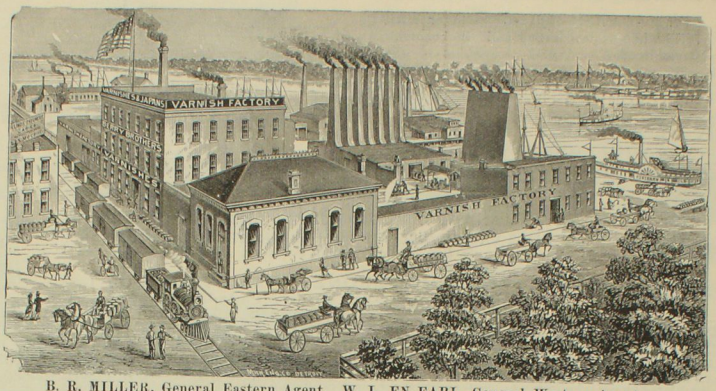

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DIRECT IMPORTERS OF

MAHOGANY

(Via New Orleans),

MANUFACTURED TO SIZES SPECIALLY ADAPTED FOR

CAR-BUILDERS.

MANUFACTURERS OF

VENEERS, CAR-BUILDERS' MATERIAL

FROM DOMESTIC AND FOREIGN WOODS.

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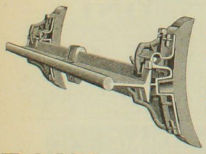
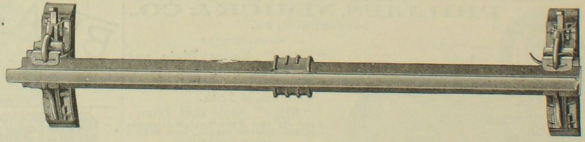
Estimates and Price Lists Furnished.

C. D'W. GIBSON, PRES'T. A. H. MARDEN, TREAS. GEO. P. JOHNSTON, SEC'Y.

THE MARDEN CAR BRAKE COMPANY.



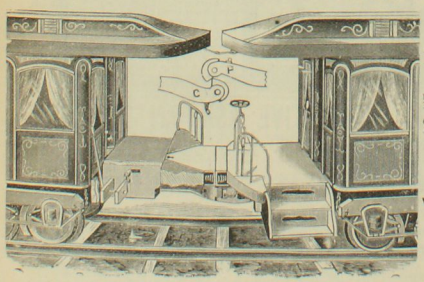
Indestructible Steel Beam.
Malleable Iron Head
To Fit any Shoe.
Security.
Durability.
Economy.



ROOM 3, SEARS BUILDING, - - - - BOSTON, MASS.

THE COWELL PLATFORM

Is the only device forming A CONTINUOUS FLOOR between cars in motion, and PREVENTING JERKING in starting and stopping trains.



THE COWELL COUPLING

Is an Improvement on the Miller and Works with it.

"Entire Satisfaction"—"Perfect Satisfaction" are the words used by R. F. Smith, Gen'l Manager Cleveland & Pittsburgh R. R.; Hiram Fowler, Supt. Connecticut Valley R. R.; J. W. Thomas, Gen'l Supt. Nashville, Chattanooga & St. Louis Ry.; J. G. Sawyer, Master Car-Builder same road, and many others.

"The most practical and perfect device in use"—S. L. Bell, an old Conductor Western & Atlantic R. R.; G. R. Carr, Gen'l Sup't Columbus, Hocking Valley & Toledo R. R.; J. W. Babcock, for years conductor N. Y., Pa. & Ohio Ry.; Gen P. Pease, of Ohio Central Railway.

"Saving much annoyance to passengers"—Chas. B. Couch, Div. Sup't Lake Shore & M. S. Ry., and others.

"A great improvement over any other device I have seen"—J. H. Tinney, Sup't N. Y. & Greenwood Lake Railway.

"It prevents jerking in starting and stopping trains," say Messrs. Babcock, Bell, Couch, Thomas, Tinney and others.

"A great saving to railroads," say Messrs. Smith, Thomas Tinney, Fowler, Bell, Babcock, and others.

Refer to the Flint & P. M., Utica I. & Elmira, Cin. Southern, C., N. O. & T. Pacific, W. & A., etc., etc.

THE COWELL PLATFORM & COUPLING CO.,

CLEVELAND, O.

DIRECTORY

the Railroads of the United States and Canada, showing the gauge, length of road, number of locomotives and number of cars; and giving the names and titles of their principal officers in charge of the operating, purchasing and rolling stock departments.

A

Adirondack R. R. 4-8½ gauge 60 m. 3 lo. 67 cars.
G. E. Durkee, *Supt.* ..... Saratoga, N. Y.
Jacob Myers, *M. M.* ..... Saratoga, N. Y.
Jas. J. Travers, *M. C. B.* ..... Saratoga, N. Y.
Addison & Northern Penn'a Ry. 3 g. 40 m. 5 lo. 50 c.
F. M. Baker, *Gen. Supt.* ..... Addison, N. Y.
Alabama Great So'n R. R. *(See Cin., N. O. & T. P.)*
Albany & Susquehanna R. R. *(See D. & H. Canal Co.)*
Albemarle & Raleigh R. R. 4-8½ g. 33 m. 3 lo. 35 c.
Jas. H. Petty, *Gen. Supt.* ..... Tarboro, N. C.
Albert Ry. 4-8½ g. 51 m. 3 lo. 35 cars.
A. Robinson, *Mon. & Pur. Agt.* ..... Hillsboro, N. B.
Jas. McKay, *M. M. & C. B.* ..... Hillsboro, N. B.
Alexandria & Fredericksburg Ry. *(See Penna. R. R.: (7) Div.*
Alexandria & Washington R. R. *(7) Div.*
Allegheny Valley R. R. 4-9 g. 259 m. 70 lo. 2202 c.
David McCargo, *Gen. Supt. & Pur. Agt.*; and C. B. Price, *Supt.* (Riv. Div.) ..... Pittsburg, Pa.
S. A. Jackson, *Supt.* (L. G. Div.), Reynoldsville, Pa.
W. A. Wood, *M. M.* ..... Verona, Pa.
R. Gunning, *M. C. B.* ..... Verona, Pa.
Alliance, Niles & Ashtabula R. R. *(See Penna. Co.)*
Annapolis & Elk Ridge R. R. 4-8½ g. 20 m. 4 lo. 29 c.
W. H. Bians, *Supt. & Pur. Agt.* ..... Ashland, Ky.
John L. Beall, *M. Mach.* ..... Annapolis, Md.
Anniston & Atlantic R. R. 3 g. 9 m.
H. L. Roberts, *Supt.* ..... Anniston, Ala.
Antwerp & Paulding R. R. 4-8½ g. 6 m. 4 lo. 63 c.
E. C. Mans *m, Gen. Mgr.*; and
William Fitzsimmons, Jr., *Pur. Agt.* Antwerp, O.
Arizona & New Mexico Ry. 3 g. 60 cars.
W. H. Jones, *Gen. Supt. & P. A.* Lordsburg, N. M.
W. C. Boylan, *M. M. & M. C. B.* Lordsburg, N. M.
Arkansas Midland R. R. 4 g. 63 m. 4 lo. 40 cars.
A. H. Johnson, *Pr. & Gen. Man.* ..... Helena, Ark.
J. B. Johnson, *M. M. & M. C. B.* ..... Helena, Ark.
Arkansas & Louisiana Ry. 4-8½ g. 16 m.
J. A. Beardsley, *Gen. Supt.* ..... Washington, Ark.
Asheville & Spartanburg R. R. 4-8½ g. 60 m. 3 lo.
Jas. Anderson, *Supt. & Pur. Agt.* Spart'b'g, S. C.
J. Sparkman, *Supt.* ..... Spartanburg, S. C.
W. B. Brown, *M. C. B.* ..... Spartanburg, S. C.
Ashland Coal & Iron Ry. 4-8½ g. 22 m. 7 lo. 432 c.
Douglas Putnam, Jr., *Gen. Supt.* ..... Ashland, Ky.
Robt. Peebles, *Pur. Agt.* ..... Ashland, Ky.
E. M. Roberts, *M. M.* ..... Ashland, Ky.
Ashtabula & Pittsburgh Ry. *(See Penna. Co.)*
Atchison, Topeka & Santa Fé R. R.
4-8½ g. 2,020 m. 348 lo. 10,029 cars.
A. A. Robinson, *Gen. Man.* ..... Topeka, Kan.
Geo. B. Harris, *Asst. Gen. Man.* ..... Topeka, Kan.
Geo. Hackney, *Supt. Mach.* ..... Topeka, Kan.
Clem. Hackney, *Asst. Sup. Mach. Dept.* do.
Geo. Hargraves, *Pur. Agt.* ..... Topeka, Kan.
Eastern Div.: D. J. Chase, *Supt.* ..... Topeka, Kan.
Henry Hull, *G. F. Car Dept.* ..... Topeka, Kan.
John Ragan, *M. M.* ..... Atchison, Kan.
J. M. Smith, *M. M.* ..... Kansas City, Mo.
Alfred Taylor, *M. M.* ..... Emporia, Kan.
Mid. Div.: H. R. Nickerson, *Supt.* Nickerson, Kan.
W. Y. Johnson, *M. M.* ..... Nickerson, Kan.
Dodge, Kan.
W. Div.: C. M. Rathburn, *Supt.* ..... La Junta, Col.
A. C. Stiles, *M. M.* ..... La Junta, Col.
D. H. Dotterer, *M. M.* ..... Raton, N. M.
Las Vegas Div.: Chs. Dyer, *Supt.* Las Vegas, N. M.
F. H. Woodruff, *M. M.* ..... Las Vegas, N. M.
J. H. Holman, *M. M.* ..... Wallace, N. M.
Rio Gr. Div.: F. F. Barr, *Supt.* Sar St. Agustin, N. M.
E. Hackett, *M. M.* ..... San Marcial, N. M.
H. P. Olcott, *M. M.* ..... Deming, N. M.
Geo. A. Hancock, *M. M.* ..... El Paso, Tex.
Sonora Div.: ..... 355 m.
L. H. Waugh, *M. M.* ..... Guaymas, Mex.
Kan. Cy., Law. & So. Kan.
4-8½ g. 260 m. 24 lo. 787 c.
J. L. Barnes, *Supt.* ..... Lawrence, Kan.
T. D. Volk, *M. M.* ..... Ottawa, Kan.
Atlanta & West Point R. R. *(See Western of Ala.)*
Atlantic & Pacific R. R. 3 g. 17 m.
E. G. Sweatt, *Gen. Man.* ..... Wesley, Ga.
Atlantic & North Carolina R. R. *(See Midland ; N. C.)*
Atlantic, Tenn. & Ohio R.R. *(See Rich. & Dan.; (2) Div.)*
Atlantic & Pacific R. R. 4-8½ g. 1,000 m. 70 lo.
F. W. Smith, *G. Supt.* ..... Albuquerque, N. M.
A. G. Thompson, *Pres. Pur. Agt.* St. Louis, Mo.
Geo. Chalender, *Supt. M. P. & M.*, and
Geo. F. Chalender, *A. Supt.* Albuquerque, N. M.
Jas. Graham, Arlz.
Augusta & Knoxville R. R. *(See Port Royal & Aug.)*
Austin & Northwestern R. R. 3 g. 60 lo. 75 c.
J. A. Rhomberg, *Gen. Man.* ..... Austin, Tex.

B

Bachman Valley R. R. *(See Han. Junc., Han. & Gett.)*
Balt. & Delaware Bay R. R. 4-8½ g. 50 m. 2 lo. 13 c.
Fred Gerker, *Gen. M. & P.* J. Chesterton Md.
Baltimore & Hanover R. R. *(See Penna. R. R.: (4) Div.)*
Baltimore & Ohio R. R.
4-8½ g. 1,612 m. 574 lo. 17,339 cars.
S. Spencer, 2d V. P. & *Gen. Man.* Baltimore, Md.
N. S. Hill, *Pur. Agt.* ..... Baltimore, Md.
Ohio Riv. Div. ..... 4-8½ g. 372 m.
W. M. Clements, *Mast. Trans.* Baltimore, Md.
A. J. Cromwell, *M. M. & C. B.* ..... Baltimore, Md.
W. G. Evers, *Act'g M. C. B.* ..... Baltimore, Md.
I. N. Kalbaugh, *M. M.* ..... Baltimore, Md.
Wm. Edwards, *Jr., M. M.* ..... Martinsburg, W. Va.
Sam. Houston, *M. M.* ..... Piedmont, W. Va.
Robert Maxwell, *M. M.* ..... Cumberland, Md.
S. B. Crawford, *M. M.* ..... Grafton, W. Va.
Alex. Laird, *M. M.* ..... Parkersburg, W. Va.
W. B. McClung, *M. M.* ..... Charleston, W. Va.
Pitts. Div.: T. M. King, *Gen. Supt.* Pittsburgh, Pa
E. F. Sampsell, *Asst. Gen. Supt.* ..... Pittsburgh, Pa.
Trans-Ohio Divs.: G. J. Forwarce, *G. Man* Newark, O.
W. H. Harrison, *Asst. M. of Mach.* Newark, O.
R. L. Welsgerber, *M. M.* ..... Newark, O.
H. M. Ingler, *M. M.* ..... Bellaire, O.
O. B. Perkins, *M. M.* ..... Zanesville, O.
Andrew Beckert, *M. M.* ..... Sandusky, O.
F. J. Gunther, *M. M.* ..... Chicago Junction, O.
Chi. Div.: ..... Gen. Supt. ..... Chicago, Ill.
Benj. Lowther, *M. M.* ..... Garrett, Ind.
W. H. Wilkinson, *M. M.* ..... Kingston, Ill.
Baltimore & Philadelphia. 4-8½ g. 20 m. 4 lo. 33 c.
D. Connell, *Supt.* ..... Washington, D. C.
Baltimore & Potomac R. R. *(See Penna. R. R.: (7) Div.)*
Bangor & Piscataquis R. R. 4-8½ g. 63 m. 4 lo. 87 cars.
Arthur Brue, *Supt. & Pur. Agt.* ..... Bangor, Me.
C. S. Nason, *M. M.* ..... Bangor, Me.
J. W. Comins, *M. C. B.* ..... Milltown, Me.
Bangor & Portland Ry. 4-8½ g. 25 m. 3 lo. 3 c.
C. Miller, *Pres. & Gen. Man.* ..... Blairstown, N. J.
Barclay R. R. 4-8½ g. 61 m. 3 lo. 80 c.
F. F. Lyon, *Supt.* ..... Barclay, Pa.
E. A. Hardenburg, *Pur. Agt.* 21 Cortlandt St., N. Y.
Wm. Johnson, *M. M.* ..... Towanda, Pa.
Batesville & Brinkley R. R. 3 g. 25 m. 2 lo. 34 c.
W. B. Martin, *Pres.* ..... Batesville, Ark.
W. J. Thompson, *Gen. Man.* Little Rock, Ark.
E. Summerfield, *Gen. Supt.* ..... Brinkley, Ark.
R. H. Davis, *Pur. Agt.* ..... Brinkley, Ark.
John White, *M. M.* ..... Brinkley, Ark.
Bath & Hammondsport R. R. 4-8½ g. 10 m.
Allen Wood, *Gen. Man.* Hammondsport, N. Y.
Baton Rouge, Grosse Tête & Opelousas R. R.
5-6 g. 29 m. 3 lo. 12 c.
D. C. Montan, *Gen. Supt.* ..... Port Allen, La.
Bedford & Bloomfield Ry. 3 g. 43 m. 5 lo. 65 cars.
Jas. W. Kennedy, *Gen. Supt. & Pur. Agt.*; and
Capt. Geo. Elliott, *M. M.* ..... Bedford, Ind.
Richard G. Elliott, *M. C. B.* ..... Bedford, Ind.
Bellaire, Zanesville & Cin. Ry. Co. 3 g. 42 m. 5 lo. 71 c.
S. L. Mooney, *Gen. Supt.* ..... Woodsville, O.
J. B. Hong, *M. M.* ..... Bellaire, O.
Bell's Gap R. R. 4-0 g. 23 m. 4 lo. 148 cars.
R. G. Ford, *Supt.* ..... Bellwood (P. O.), Pa.
Geo. Van Brunt, *M. M.* ..... Bellwood, Pa.
A. Zimmerman, *M. C. B.* ..... Bellwood, Pa.
Belt R. R. 4-8½ g. 12 m. 10 lo.
W. P. Jams, *Supt.* ..... Indianapolis, Ind.
Bennington & Glastonbury. 4-8 g. 10 m.
E. C. Rood, *Pres.* ..... Bennington, Vt.
Bennington & Rutland Ry. 4-8½ g. 50 m. 10 lo. 236 c.
F. C. White, *Supt. & Pur. Agt.* Bennington, Vt.
G. W. Blanchard, *M. M.* ..... Worcester, Mass.
Berlin Branch R. R. *(See Han. Junc., Han. & Gett.)*
Bingham, Canyon & Camp Floyd R. R. *(See Den. & R. Gr.)*
Bladen, Columbus & Florida. 4-8½ g. 16 m. 2 lo. 2 c.
John Colville, *Pres.* ..... Wilmington, N. C.
Bod & Benton Ry. 3 g. 34 miles.
Thomas Holt, *Supt. & Pur. Agt.* ..... Bodie, Cal.
E. H. Barton, *M. M. & C. B.* ..... Bodie, Cal.
Boston, Barre & Gardner. 4-8½ g. 37 m. 8 lo. 108 c.
H. H. Marshall, *Supt. & Pur. Agt.* Bennington, Vt.
Frank I. Goodwin, *M. M.* ..... Worcester, Mass.
Boston, Hoosac Tunnel & W'n Ry.
4-8½ g. 87 m. 18 lo. 1,038 cars.
H. L. Morrill, *Gen. Man.* ..... Mechanicsville, N. Y.
C. H. Cory, *Pur. Agt.* ..... Mechanicsville, N. Y.
C. H. Cory, *Supt. & M. M.* ..... Mechanicsville, N. Y.
John S. Ellis, *C. B.* ..... Mechanicsville, N. Y.
Boston, Revere Beach & Lynn R. R. 3 g. 9 m. 7 lo. 46 c.
C. A. Hammond, *Supt. & P. Agt.* Boston, Mass.
H. D. Sutherland, *M. M.* ..... Boston, Mass.
John Cornlan, *M. C. B.* ..... Boston, Mass.
Boston, Winthrop & Point Shirley R. R.
4 g. 10 m. 1 lo. 8 c.
C. A. Parks, *Supt.* ..... Boston, Mass.
W. Davis, *M. M.* ..... Winthrop, Mass.
Boston & Albany R. R. 4-8½ g. 372 m. 245 lo. 6,111 c.
W. H. Barnes, *Gen. Supt.* ..... Boston, Mass.
E. Gallup, *Asst. Supt.* ..... Springfield, Mass.
A. B. Underhill, *Supt. M. P.* ..... Springfield, Mass.
P. D. Adams, *Gen. M. M.* ..... Boston, Mass.
H. B. Chesley, *Div. Supt.* ..... Boston, Mass.
G. H. Colby, *Div. M. M.* ..... Boston, Mass.
C. E. Grover, *Div. Supt.* ..... Springfield, Mass.
H. W. Eddy, *Div. M. M.* ..... Springfield, Mass.
J. B. Weston, *Pur. Car Sh.* Springfield, Mass.
W. H. Russell, *Jr., Div. Supt.* E. Albany, N. Y.
T. B. Purvis, *Div. M. M.* ..... East Albany, N. Y.
J. E. Doran, *Pur. Car Sh.* ..... East Albany, N. Y.
Boston & Lowell R. R.
4-8½ g. 101 m. 82 lo. 2,565 cars.
C. S. Mellen, *Gen. Supt.* ..... Boston, Mass.
H. Nourse, *Pur. Agt.* ..... Boston, Mass.
Jas. A. Taylor, *Supt. R. S. & M.* Concord, N. H.
So. Div.: J. F. Crockett, *Supt.* ..... Boston, Mass.
E. T. Sumner, *M. M.* ..... Boston, Mass.
No. Div.: Geo. A. Todd, *Supt.* ..... Concord, N. H.
C. C. Aspinwall, *M. M.* ..... Concord, N. H.
Wh. Mount Div.: W. A. Stowell, *Supt.* Concord, N. H.
Geo. A. Furguson, *M. M.* ..... Lake Village, N. H.
Boston & Maine R. R. 4-8½ g. 206 m. 80 lo. 2,200 c.
J. T. Furber, *Gen. Supt. & P. A.* Boston, Mass.
Geo. J. Fisher, *Pur. Agt.* ..... Boston, Mass.
Wm. Smith, *M. M.* ..... Boston, Mass.
D. C. Richardson, *M. C. B.* ..... Lawrence, Mass.
Boston & N. Y. Air Line R. R. *(See N. Y., N. H. & H.)*
Boston & Providence R. R. 4-8½ g. 67 m. 32 lo. 1,006 c.
A. A. Folsom, *Gen. Supt. & P. A.* Boston, Mass.
Geo. Richards, *M. M.* ..... Roxbury, Mass.
Jno. Lightner, *M. C. B.* ..... Roxbury, Mass.
Bowling Green R. R. 4-8½ g. 0 m. 2 lo. 4 c.
Wm. A. Wiggins, *Gen. Man.* Bowling Green, O.
Wm. A. Wiggins, *Pur. Agt.* ..... Bowling Green, O.
Bradford, Bordell & Kinzua R. R. 3 g. 42 m. 9 lo. 82 c.
Bradford, Eldred & Cuba. 3 g. 54 m. 5 lo. 70 c.
Tonawanda Valley & Cuba. 3 g. 60 m. 5 lo. 31 c.
B. C. Williams, *Gen. Man. & P. A.* Brad'd, Pa.
Jno. Delaney, *M. M. & M. C. B.* ..... Brad'd, Pa.
Brattleboro' & Whitehall R. R. 3 g. 36 m. 3 lo. 56 c.
(Operated by Central Vermont.)
Breakwater & Frankford R. R. *(See Del., Md. & Va.)*
Bridgton & Saco River R. R. 2 g. 16 m. 2 lo. 19 c.
Wm. F. Perry, *Gen. Supt* ..... Bridgton, Me.
M. M. Caswell, *M. M. & Pur. Agt.* Bridgton, Me.
Brighthope Ry. 3 g. 37 m. 4 lo. 100 cars.
Jas. R. Worth, *Supt.* ..... Richmond, Va.
P. M. Buckingham, *Pur. Agt* Richmond, Va.
A. Gary, *Supt. Wag & Car Shops* Richmond, Va.
Robt. Kredell, *M. M.* ..... Chester, Va.
Brooklyn, Bath & Coney Island R. R.
4-8½ g. 7 m. 36 cars.
Geo. A. Gunther, *Gen. Man.* ..... Brooklyn, N. Y.
Aug. Wolff, *M. M.* ..... Brooklyn, N. Y.
Brooklyn, Flatbush & Coney Island Ry.
4-8½ g. 7 m. 7 lo. 54 c.
J. L. Morrow, *Supt. & A.* ..... Brooklyn, N. Y.
Wm. Finley, *M. M.* ..... Brooklyn, N. Y.
Brooklyn & Rockaway Beach R. R.
4-8½ g. 3 m. 2 lo. 18 cars.
Wm. Warner, *Supt.* ..... East New York, N. Y.
Brunswick & Western R. R. 4 g. 172 m. 13 lo. 170 c.
H. S. Morse, *Gen. Man. & P. A.* Brunswick, Ga.
R. J. Evans, *Supt.* ..... Brunswick, Ga.
W. R. Kline, *M. M.* ..... Brunswick, Ga.
Buff., N. Y. & Phil. R. R. 4-8½ g. 655 m. 301 lo. 6,339 c.
Geo. S. Gatchell, *Gen. Supt.* ..... Buffalo, N. Y.
W. W. Halsey, *Asst. to G. Supt.* Buffalo, N. Y.
Allen Vail, *Supt. M. P.* ..... Buffalo, N. Y.
Buff. Div.: Henry Dwyer, *Supt.* ..... Buffalo, N. Y.
Roch. Div.: ..... Olean, N. Y.
Pitts. Div.: E. H. Witter, *Supt.* ..... Oil City, Pa.
H. J. Bookhammer, *M. M.* ..... Oil City, Pa.
John Monks, *M. C. B.* ..... Oil City, Pa.
C. E. Turner, *M. M.* ..... Olean, N. Y.
Burlington, Cedar Rapids & Northern Ry.
4-8½ g. 713 m. 70 lo. 5,000 cars.
C. J. Ives, *Pres.* ..... Cedar Rapids, Ia.
Robt. Williams, *Gen. Supt.* ..... Cedar Rapids, Ia.
T. Stickney, *Pur. Agt.* ..... Cedar Rapids, Ia.
R. W. Bushnell, *M. M. & C. B.* ..... Cedar Rapids, Ia.
Burlington & Lamoille R. R. 4-8½ g. 35 m. 4 lo. 64 c.
G. L. Linsley, *Gen. Man. & Supt.* Burlington, Vt.
F. G. Brownell, *M. M. & C. B.* ..... Burlington, Vt.
Burlington & Mo. Riv. R. R. (in Neb.) *(See C. B. & Q.)*
Burlington & North-West'n Ry. 3 g. 38 m. 1 lo. 97 c.
Burlington & Western R. R. 3 g. 15 m. 38 c.
W. H. Jones, *Supt.* ..... Burlington, Ia.
Burlington & Ohio River R. R. 4-8½ g.
R. Tanner, *Pur. Agt.* ..... Chicago, Ill.

C

California Northern R. R. 4-8½ g. 26 m. 2 lo. 17 c.
Andrew J. Binney, *Gen. Man.* Marysville, Cal.
California Southern R. R. 4-8½ g. 178 m. 5 lo. 301 c.
J. N. Victor, *Supt.* ..... National City, Cal.
J. M. Keith, *M. M.* ..... National City, Cal.
Cambridge & Seaford. *(See Penna. R. R.: (2) Div.)*
Camden Atlantic R. R. *(See Penna. R. R.; (2) Div.)*
Canada Southern Ry. *(See Mich. Cen.; (2) Div.)*
Canada Atlantic Ry. 4-8½ g. 82 m.
D. C. Linsley, *Man.* ..... Ottawa, Ont.
W. Donaldson, *M. M.* ..... Ottawa, Ont.
Canadian Pacific R. R. 4-8½ g. 1,742 m. 1181 2,726 c.
W. C. Van Horne, *Gen. Man.* ..... Montreal, Que.
T. G. Shaughnessy, *Asst. G. M.* Winnipeg, Man.
T. R. F. Brown, *Mech. Supt.* ..... Montreal, Que.
T. G. Shaughnessy, *Pur. Agt.* ..... Montreal, Que.
E. Div.: Archer Baker, *Gen. Supt* Montreal, Can.
Thos. Hayes, *Asst. Gen. Supt.* Winnipeg, Man.
W. Div.: J. M. Egan, *Gen. Supt.* ..... Winnipeg, Man.
F. C. Butterfield, *M. M. & M. C. B.* Winnipeg, Man.
Cape F'r & J. Valley R. R. 4-8½ g. 112 m. 7 lo. 90 c.
J. S. Morrison, *Gen. Supt.* ..... Fayetteville, N. C.
Isaac W. Clark, *M. M. & C. B.* ..... Fayetteville, N. C.
Cape Girardeau Southwestern Ry.
4-8½ g. 33 m. 3 lo. 20 cars.
Louis Houck, *Gen. Man.* Cape Girardeau, Mo.
W. A. Penney, *Gen. Supt.* Cape Girardeau, Mo.
W. H. Wheeler, *Pur. Agt* Cape Girardeau, Mo.
Fred Glover *M. M.* ..... Cape Girardeau, Mo.
Carolina Central R. R. *(See Ral. & Aug.)*
Carolina & Greenville Ry. 4-8½ g. 13 m.
R. W. Shepard, *Pres.* ..... Montreal, Can.
Carson & Colorado R. R. *(See Cal. & Virginia.)*
Catasauqua & Fogelsville. 4-8½ g. 25 m. 0 lo. 581 c.
C. W. Chapman, *Supt. & P. A.* Catasauqua, Pa.
J. Thomas, *M. M.* ..... Hokendaugua, Pa.
Chas. J. Holbach, *M. C. B.* ..... Catasauqua, Pa.
Catskill Mountain R. R. 3 g. 16 m. 2 lo. 20 cars.
Charles A. Beach, *Supt.* ..... Catskill, N. Y.
Cazenovia, Canastota & De Ruyter. *(See C., D. & E.)*
Central and South-Western Railroads (Ga.).
5 g. 1,115 m. 145 lo. 3,008 cars.
W. G. Raoul, *Pres.* ..... Savannah, Ga.
Wm. Rogers, *Gen. Supt.* ..... Savannah, Ga.
C. H. Carson, *Pur. Agt.* ..... Savannah, Ga.
Cen. Div.: D. D. Arden, *M. M.* ..... Savannah, Ga.
T. F. Hunt, *M. M.* ..... Savannah, Ga.
F. Devine, *M. C. B.* ..... Savannah, Ga.
So.-West'n Div.: T. D. Kline, *Supt.* ..... Macon, Ga.
D. M. Gugel, *M. M.* ..... Macon, Ga.
James A. Knight, *M. C. B.* ..... Macon, Ga.
Central R. R. of Ga. *(See Cent. of Georgia Ry.)*
Central R. R. of S. C. *(See Wil. & Wel.)*
Central American & Pacific Ry. 3 g. 67 m. 1 lo. 11 c
W. C. Fitzsimmons, *Gen. Supt.* Escuntla, Guat.
Central Branch Union Pac. *(See Mo. Pac.; (3) Div.)*
Central Iowa Ry. 4-8½ g. 412 m. 50 lo. 1,050 c.
E. L. Dudley, *Supt.* ..... Marshalltown, Ia.
J. G. Robinson, *Asst. Supt.* ..... Marshalltown, Ia.
D. D. Phelps, *Asst. Supt.* ..... Monmouth, Ill.
W. R. Coppock, *Asst. Pur. Agt.* Marshalltown, Ia.
John Player, *M. M.* ..... Marshalltown, Ia.
T. L. Seevers, *M. C. B.* ..... Marshalltown, Ia.
Central Ontario Ry. 4-8½ g. 33 m. 4 lo. 66 cars.
J. B. McMullen, *Gen. Man.* ..... Picton, Ont.
James Falconar, *M. M.* ..... Trenton, Ont.
Central Pac. R. R. 4,303 m. 382 lo. 11,000 c.
A. N. Towne, *Gen. Man.* ..... San Francisco, Cal.
J. A. Fillmore, *Gen. Supt.* ..... Marshalltown, Ia.
R. H. Pratt, *A. G. Supt.* ..... San Francisco, Cal.
J. R. Watson, *Gen. Pur. Agt.* Sacramento, Cal.
A. J. Stone, *Gen. Mech. Supt.* ..... Sacramento, Cal.
W. McKenzie, *Asst. G. M. M.* Sacramento, Cal.
Benj. Welch, *Gen. M. C. B.* ..... Sacramento, Cal.
G. J. Turner, *Asst. G. M. C. B.* Sacramento, Cal.
Western Visalia & Tulare Divs. and Northern Ry.
A. D. Wilder, *Supt.* ..... W. Oakland, Cal.
G. D. Welch, *M. M.* (W. Div.) W. Oakland, Cal.
W. B. Gilbert, *M. M.* (N. W. Div.) ..... Carlin, Nev.
S. Johnson, *M. M.* (T. Div.) ..... Tulare, Cal.
D. Rutherford, *M. M.* (N. Rd.) S. Vallejo, Cal.
Sacramento Oregon Divs.; and Cal. Pac. R. R.
J. B. Wright, *Supt.* ..... Sacramento, Cal.
Wm. F. Cooley, *M. M.* (S. Div.) Sacramento, Cal.
Truckee Div.: J. H. Whited, *Supt* Wadsworth, Nev.
Geo. Fregg, *M. M.* ..... Wadsworth, Nev.
Wm. McPherson, *F. Car Sh.*. Wadsworth, Nev.
Humb't Div.: G. W. Coddington, *Supt.* Carlin, Nev.
W. F. Bailey, *M. M.* ..... Carlin, Nev.
J. C. Doughty, *Pur. Car Sh.* ..... Carlin, Nev.
Salt Lake Div.: A. G. Fell, *Supt.* ..... Ogden, Utah.
James Lamb, *M. M.* ..... Terrace, Utah.
A. Sherburne, *Pur. Car Sh.* ..... Ogden, Utah.
Colorado Div.: P. B. Groesbeck, *Supt.* Ogden, Utah.
St. & Cop. R. R.: R. L. Myrick, *Supt.* Stockton, Cal.
Los Angeles & Independence R. R. Co.
E. E. Hewitt, *Asst. Supt.* ..... Los Angeles, Cal.
James Velsir, *M. M.* ..... Los Angeles, Cal.
Wm. Gilbert, *M. M. Car Sh.* Los Angeles, Cal.
Arizona Divs. (So. Pac.).
J. A. Muse, *Asst. Supt.* ..... Tucson, Ariz.
W. F. Smith, *M. M.* ..... Tucson, Ariz.
Rio Grande (S. Pac.) & El Paso (G H. & S. A.) Divs.:
C. H. Seymour, *Supt.* ..... Houston, Tex.
C. G. Thompson, *Supt.* ..... Houston, Tex.
San Ant. Div.: Wm. Vleck, *Gen. Supt.* San Antonio, Tex.
J. J. Ryan, *M. M.* ..... San Antonio, Tex.
H. Bryan, *Car Shops* ..... Houston, Tex.
Louisiana Div.: W. Irwin, *Supt.* ..... Houston, Tex.
D. C. Smith, *M. M.* ..... Houston, Tex.
El Paso Div.: Jas. Campbell, *Supt* El Paso, Tex.
J. L. Bonner, *M. M.* ..... El Paso, Tex.
Central Vermont R. R. *(See House of Rep. Con.)*
Central Vermont R. R. 4-8½ g. 673 m. 136 lo. 2,789 c.
J. W. Hobart, *Gen. Man.* ..... St. Albans, Vt.
J. Needham, *Asst. Gen. Man. & M. M.* St. Albans, Vt
No. Div.: I. B. Futvoye, *Supt.* ..... St. Johns, P. Q.
Pur. Agt. ..... Rutland, Vt.
N. L. Davis, *M. M. & C. B.* ..... Rutland, Vt.
Brattleboro & Whitehall R. R., and
Brat. Div.: E. F. Brooks, *Supt.* ..... Brattleboro, Vt.
New London & N. R. R. 143 m. 22 lo. 305 c.
C. F. Spaulding, *Supt. & P. A.* New London, Ct.
I. W. Dow, *M. M.* ..... New London, Ct.
S. O. Banks, *M. C. B.* ..... New London, Ct.
Chagrin Falls & Northern R. R. 3 g. 6 m. 1 lo. 12 c.
W. Hutchings, *Gen. Man.* ..... Chagrin Falls, O.
H. S. Haines, *Supt.* ..... Chagrin Falls, O.
Charleston & Savannah Ry. 3 g. 175 lo. 190 c.
H. S. Haines, *Gen. Man.* ..... Savannah, Ga.
C. S. Gadsden, *Gen. Supt.* ..... Charleston, S. C.
H. A. Ulmo, *M. M.* ..... Savannah, Ga.
Charlotte, Columbia & Augusta R. R. *(See C., C. & A.)*
Chateaugay R. R. 3 g. 34 m. 7 lo. 365 cars.
A. L. Inman, *Gen. Man.* ..... Lyndonville, N. Y.
J. W. Davis, *Supt.* ..... Lyon Mountain, N. Y.
M. L. French, *Asst. Supt.* ..... Plattsburg, N. Y.
Chatham Ry. 4-8½ g. 9 m.
J. B. Snowball, *Man.* ..... Chatham, N. B.
Chattarol Ry. 4-8½ g. 51 miles 1 locos. 485 cars.
F. H. Oliphant, *Gen. Man. & P. A.* Ashland, Ky.
J. R. Martin, *M. M.* ..... Ashland, Ky.
Geo. S. Gatchell, *M. C. B.* ..... Ashland, Ky.
Cheraw & Chester R. R. *(See Rich. & Dan.; (2) Div.)*
Cheraw & Darlington R. R. *(See Wil. & Wel.)*
Cheraw & Salisbury R. R. *(See Wil. & Wel.; (2) Div.)*
Cherokee R. R. *(See East & West.)*
Cherry Valley R. R. 4-8½ g. 6 m. 1 lo. 4 cars.
E. T. Herndon *Supt.* ..... Midland, Mo.
Chesapeake, Ohio & South-Western.
4-9 g. 598 m. 62 lo. 1,345 c.
Jas. L. Frazier, *Supt.* ..... Louisville, Ky.
H. B. Hutchins, *Gen. Pass. Agt.* Louisville, Ky.
J. S. Reeves, *Supt. Trans* ..... Louisville, Ky.
R. H. Briggs, *Supt. M. P.* ..... Louisville, Ky.
J. L. Hall, *M. M.* ..... Elizabethtown, Ky.
Jno. Fitzgerald, *M. M.* ..... Paducah, Ky.
Chesapeake & Ohio Ry. 4-8½ g. 642 m. 210 lo. 4,000 c.
C. W. Smith, *Gen. Man.* ..... Richmond, Va.
D. A. Sweet, *Asst. Gen. Man.* ..... Richmond, Va.
A. S. Emmons, *Pur. Agt.* ..... Richmond, Va.
T. L. Chapman, *Supt. M. P.* ..... Richmond, Va.
Eastern Dist.: Wood, *Supt.* ..... Richmond, Va.
J. N. King, *M. C. B.* ..... Richmond, Va.
H. Pierce, *M. M.* ..... Richmond, Va.
Hunt. Div.: W. B. Ryder, *Supt.* ..... Hinton, W. Va.
W. H. Thomas, *M. M.* ..... Huntington, W. Va.
H. C. Basinger, *M. M.* ..... Huntington, W. Va.
Lex. Div.: J. D. Yarrington, *Supt.* ..... Lexington, Ky.
S. B. Tuggle, *M. M.* ..... Lexington, Ky.
K. C. Div.: W. Bender, *Supt.* ..... Lexington, Ky.
A. H. Watts, *M. M.* ..... Lexington, Ky.
Cheshire R. R. 4-8½ g. 80 m. 10 lo. 531 cars.
R. Stewart, *Gen. Man.* ..... Keene, N. H.
W. H. Ellis, *Supt.* ..... Keene, N. H.
F. A. Perry, *M. M.* ..... Keene, N. H.
A. E. Howard, *M. C. B.* ..... Keene, N. H.
Chester & Lenoir R. R. *(See Rich. & Dan.; (2) Div.)*
Chicago, Bur. & han. City Ry. *(See C. B. & Q.)*
Chicago, Burlington & Quincy R. R.
4-8½ g. 3,608 m. 545 lo. 21,012 cars.
T. J. Potter, *Gen. Man.* ..... Chicago, Ill.
(1) C., B. & Q. Riv. Div. ..... 4-8½ g. 244 m.
H. B. Stone, *Asst. Gen. Man.* ..... Chicago, Ill
W. Irving, *Gen. Pass. Agt.* ..... Chicago, Ill.
G. W. Rhodes, *Supt. M. P.* ..... Aurora, Ill.
Wm. Forsyth, *Mech. Eng.* ..... Aurora, Ill.
Ill. Div.: J. Hall, *Supt.* ..... Galesburg, Ill.
Chi. Div.: Geo. Alexander, *Supt.* ..... Aurora, Ill.
L. B. Wyman, *M. M.* ..... Aurora, Ill.
Galesburg Div.: F. C. Rice, *Supt* Galesburg, Ill.
Robert Colville, *M. M.* ..... Galesburg, Ill.
St. L. Div.: W. Brown, *Supt.* Burlington, Ia.
A. Forsyth, *M. M.* ..... Beardstown, Ill.
Ia. & Mo. Riv. Div.: J. Merrill, *Supt* Burlington, Ia.
East. Div.: O. E. Stewart, *Supt.* Burlington, Ia.
Joel West, *M. M.* ..... Burlington, Ia.
Mid. Div.: J. B. Maxon, *Supt.* ..... Ottumwa, Ia.
West'n Div.: J. H. Dugan, *Supt* ..... Creston, Ia.
C. W. Keller, *M. M.* ..... Creston, Ia.
Chi. B. & Kan. Cy. and St. L., Keo. & No.-W'n Rys.
Robt. Law, *Gen. Supt.* ..... Chicago, Ill.
W. H. Barnes, *M. M.* ..... Burlington, Ia.
(2) C. B. & Q. West of Mo. Riv.
(a. W. Holdrege, *Asst. Gen. Man.* Omaha, Neb.
C. M. Wead, *Supply Agt.* ..... Omaha, Neb.
D. Hawksworth, *M. M.* ..... Plattsmouth, Neb.
C. M. Wead, *Stock'pr.* ..... Plattsmouth, Neb.
Bur. & Mo. Riv. & Neb. Ry. Divs.:
T. E. Calvert, *Gen. Supt.* ..... Lincoln, Neb
D. E. Thompson, *Supt.* ..... Lincoln, Neb.
E. Bignell, *M. M.* ..... Lincoln, Neb.
R. V. Div.: A. Campbell, *Supt.* ..... McCook, Neb.
A. S. Div.: J. McConnell, *Supt.* ..... Lincoln, Neb
Chicago, Fairfield & Eau Claire R. R.
4-8½ g. 20 m. 3 lo. 28 cars.
N. C. Foster, *Gen. Man.* ..... Fairchild, Wis.
C. I. Wickersham, *Pur. Agt.* ..... Chicago, Ill.
Chicago, Iowa & Dakota Ry. 4-8½ g. 26 m
John Porter, *Gen Man.* ..... Eldora, Ia.
Chicago, Milwaukee & St. Paul R. R.
4-8½ g. 5,201 m. 626 lo. 19,018 cars.
S. S. Merrill, *Gen. Man.* ..... Milwaukee, Wis.
H. Miller, *Asst. Gen. Man.* ..... Milwaukee, Wis.
J. T. Clark, *Gen. Supt.* ..... Milwaukee, Wis.
A. J. Earling, *Asst. Gen. Supt.* Milwaukee, Wis.
J. T. Crocker, *Pur. Agt.* ..... Milwaukee, Wis.
J. M. Lowry, *Gen. M. M.* ..... Milwaukee, Wis.
E. Fairburn, *M. M.* ..... Milwaukee, Wis.
John Bailie, *Supt. Car Dept.* Milwaukee, Wis
W. E. Kittridge, *M. C. B.* ..... Milwaukee, Wis.
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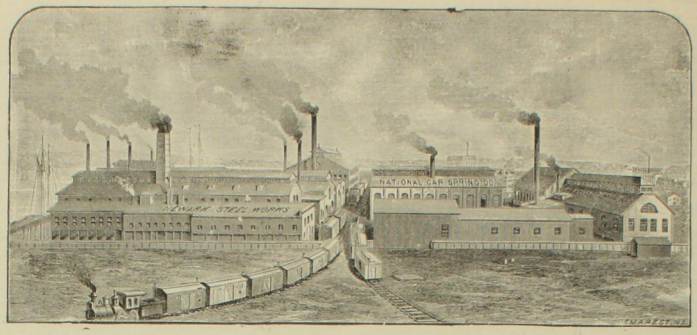

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OFFICE, 13 BARCLAY STREET, NEW YORK.

HOPKINS VERSUS LE ROY!

THE QUESTION.

Does the Le Roy Journal Bearing Company "stand ready" to make what are commonly known as Hopkins Journal Bearings, because of numerous disgusting failures, resulting from the use of the weak, gridiron arrangement known as the Le Roy Bearing heretofore made and sold by them, and the consequent necessity of going out of business or giving their customers a really good bearing even if they have to "pirate" the invention for which a patent was granted to Hopkins that has been declared valid by both the Eastern and Western Railroad Association?

Does the Le Roy Company expect to build up a business by infringing Hopkins' Patent, and selling bearings, and a lawsuit with them?

In the recent interference patent fight between Hopkins and Le Roy, the Commissioner of Patents, in his final decision, which was rendered August 31, 1883, says:

"On the broad claim, as well as the specific claim covering the device embodying not only the broad but the specific invention of a journal bearing with a soft metal lining, with ridges or projections so arranged that, upon being brought in contact with the axle, the ridges or projections will yield and spread out so as to make a perfectly-fitting box, priority of invention must be awarded to Hopkins."

As to the specific arrangement for which priority of invention was awarded to Le Roy, all will perceive that the broad claim for which priority of invention is awarded to Hopkins, and the very broad claim embodied in the patent granted him Oct. 16, 1883, in the following words: "A Journal Bearing made of two different metals, one of soft or yielding nature, and the other of a hard or unyielding nature, the soft or yielding carrying ridges or spurs which receive the initial pressure of the journal, and by the rolling action of the same and the load pressure upon the bearing becomes crushed down and spread in conformity with the contour thereof, as described, whereby the surfaces in wearing contact are adjusted to each other, substantially as specified,"

COVERS THE WHOLE CASE

AN OLD ADAGE SAYS: "SUE A BEGGAR AND CATCH A LOUSE."

Will Mr. McLean, of the so-called Le Roy Journal Bearing Co., give to Mr. Hopkins and to Railroad Companies and Car-Builders any reliable proof that his Company is in reality anything else than an irresponsible piratical concern (see his advertisement) that is absolutely judgement proof, and any guarantees it may offer against suits by Hopkins are not perfectly worthless, and in so doing will he talk plain, honest common sense, instead of craftily stringing together a lot of words (see his advertisement) that mean nothing unless they mislead?

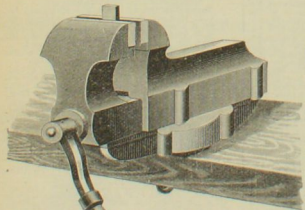
No invention ever did or can infringe any patent. It is not the invention in any case that infringes, but the making, selling or using of a thing patented without the right to do so. Talk about making an offer to settle a point that does not exist is as cheap as it is misleading and worthless.

As to his being the prior inventor of Bearings with soft metal ridges for receiving the Initial pressure of the Journal, and leaves him absolute master of the situation.

All parties are hereby warned that my rights under said Letters Patent will be enforced.

D. A. HOPKINS, Patentee and Manufacturer,

113 Liberty Street, - - - - New York.



Handle moves only half a circle.

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Loose jaw is slid to work and grip given with less than half a turn of handle.

Gripping parts coming into gear vertically give the strength desired for heavy chipping.

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J. S. Patterson, *M. of Mach. & M. C. B.*.....Cincinnati, O.
Cincinnati, New Orleans & Texas Pacific Ry. Co.
5 g. 846 m. 123 lo. 3,464 cars.
John Scott, *Gen. Man.*.....Cincinnati, O.
Richard Carroll, *Gen. Supt.*.....Cincinnati, O.
R. W. Healey, *Gen. Pur. Agt.*.....Cincinnati, O.
James Meehan, *M. of T.*.....Cincinnati, O.
Cin. So. Div.: W. W. Wells, *Supt.*..Somerset, Ky.
J. L. Tomlinson, *Asst. S. M. P.*..Ludlow, Ky.
John Richardson, *M. C. B.*.....Cincinnati, O.
A. Thomson, *M. M.*.....Chattanooga, Tenn.
Ala. Gr. So Div.: D. McLaren, *Supt.*, and
George Manuell, *M. M.*...Chattanooga, Tenn
J. M. Kelly, *M. C. B.*.....Chattanooga, Tenn.
V. & M. Div.: E. F. Raworth, *Supt.*, and
M. M.....Vicksburg, Miss.
V. S. & P. Div.: F. Y. Dabney, *Superintendent*.
W. Bell Smith, *M. M. & C. B.*.....Monroe, La.
New Orleans & North-Eastern R. R.
T. T. Williams, *Supt.*.....New Orleans, La.
I. W. Fowle, *M. M.*.....Meridian, Miss.
Cincinnati Northern Ry.
Geo. L. Barringer, *Gen. Man.*...Cincinnati, O.
Cincinnati, Richmond & Chicago R. R.....Cincinnati, O.
C. J. Hepburn, *Supt.*.....Cincinnati, O.
Cincinnati, Selma & Mobile R.R. 5 g. 71 m. 0 lo. 148 c.
A. McCallister, *Supt.*.....Selma, Ala.
H. L. Wright, *Pur. Agt.*.....Selma, Ala.
J. M. Lewis, *M. M.*.....Marion, Ala.
Cincinnati, Van Wert & Michigan R. R.
4-9 g. 81 m. 7 lo. 168 cars.
E. Garrison, *Gen. Man.*.....Van Wert, O.
D. R. Ennis, *Supt. & P. A.*.....Van Wert, O.
H. H. Garr, *M. M. & M. C. B.*.....Van Wert, O.
Cin., Wabash & Mich. Ry. 4-8½ g. 165 m. 14 lo. 402 c.
Norman Beckley, *Gen. Man. & P. A.*..Elkhart, Ind.
O. W. Laugsdorf, *Supt.*.....Wabash, Ind.
S. B. Tinker, *M. M. & M. C. B.*.....Wabash, Ind
Cin., Wash. & Balt. 4-8½ g. 402 m. 65 lo. 1,000 cars
Jas. H. Stewart, *Gen. Man.*.....Cincinnati, O.
Edw. Evans, *M. M.*.....Chillicothe, O.
T. G. Duncan, *Supt. Car Dept.*.....Cincinnati, O.
Cincinnati, Wheeling & New York R. R. 4-8½ g. 13 m.
Thos. R. Sharp, *Pres.*.....New York, N. Y.
Cincinnati & Eastern Ry. 3 g. 100 m. 7 lo. 133 cars.
S. Woodward, *Gen. Man.*.....Cincinnati, O.
G. H. Wilber, *Gen. Sup. & Pur. Agt.*.Cincinnati, O.
P. W. Naughton, *M. M.*.....Newtown, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, *Gen. Man.*.....Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 50 cars.
A. H. Kunst, *Pres. & Gen. Man.*.Weston, W. Va.
Sam. A. Steel, *M. M.*.....Weston, W. Va.
S. B. Tinker, *M. M. & M. C. B.*.....Wabash, Ind
Cin., Wash. & Balt. 4-8½ g. 402 m. 65 lo. 1,000 cars
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P. W. Naughton, *M. M.*.....Newtown, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
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A. H. Kunst, *Pres. & Gen. Man.*.Weston, W. Va.
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Cleveland, Columbus, Cincinnati & Indiana and Indianapolis & St. Louis Ry. 4-8½ g. 1,150 m.
R. R. 4-8½ g. 785 m. 246 lo. 7,988 cars.
E. B. Thomas, *Gen. Man.*.....Cleveland, O.
J. L. Yale, *Pur. Agt.*.....Cleveland, O.
W. F. Turrell, *Gen. M. M.*.....Cleveland, O.
Col. & Cin. Div.: Robt. Blee, *Supt.*.....Columbus, O.
Wm. Garsting, *M. M.*.....Cleveland, O.
G. H. Wilber, *Gen. Sup. & Pur. Agt.*.Cincinnati, O.
P. W. Naughton, *M. M.*.....Newtown, O.
Cincinnati & South-Eastern Ry. 4-8½ g. 18 m.
John V. Patton, *Gen. Man.*.....Newport, Ky.
Clarksburg, Weston & Glenville R. R.
3 g. 26 m. 3 lo. 50 cars.
A. H. Kunst, *Pres. & Gen. Man.*.Weston, W. Va.
Sam. A. Steel, *M. M.*.....Weston, W. Va

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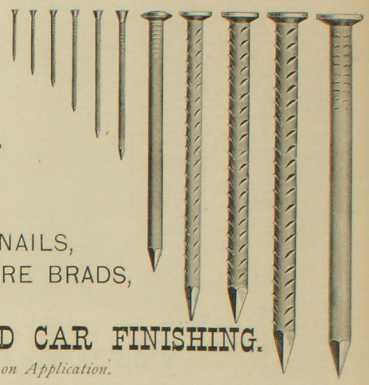
WIRE NAILS.



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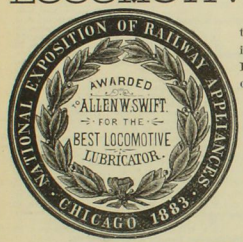
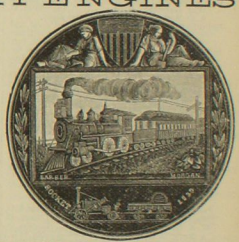


This device delivers any desired quantity to each cylinder POSITIVELY, and its feed-rate remains unchanged with the Engine at FULL STROKE, THROTTLED or REVERSED.

Will feed any ordinary Lubricant from the lightest oils to the HARDEST TALLOW IN THE COLDEST WEATHER.



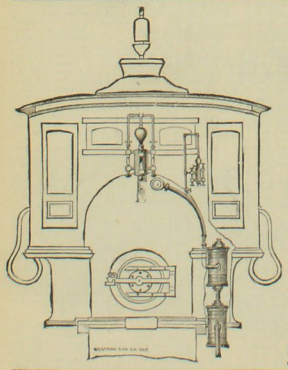
Positive Feed Flash "Sight."

NO EXTERNAL OR INTERNAL PIPES,
NO GLASS TUBES OR LOOSE JOINTS.
Approved by the Eastern and Western R. R. Association.

NOW IN USE ON THE LEADING RAILROADS IN THE COUNTRY, INCLUDING
Pennsylvania R. R., Union Pacific R. R., New York, West Shore & Buffalo, Chicago & Alton, Lehigh Valley, Delaware, Lackawanna & Western R. R.

CORRESPONDENCE SOLICITED.

"SWIFT" LUBRICATOR COMPANY, ELMIRA, N. Y.



THE DETROIT LUBRICATOR COMPANY'S

SIGHT FEED LUBRICATORS,

For Locomotive Cylinders and Air-Pumps.

The attention of railroad men is invited to the Detroit Lubricator Co.'s Patent Sight Feed Lubricators, for oiling locomotive valves and cylinders, and the Westinghouse Air Pump. Both cups are placed within the cab. The valve cup has a double sight feed, each of which is connected to the right and left hand steam chests, by means of the so-called "tallow pipes," running beneath the jacket, thus securing *independent lubrication to each steam chest and cylinder from the one cup.* The oil is shown passing in drops through each sight feed glass to the parts to be lubricated, and can be regulated to feed fast or slow. *The feed is regular and continuous, going up or down grade, whether pressure is on or off,* thus securing perfect lubrication at all times. What is said in reference to the valve cup, is equally true in regard to our lubricator for the Westinghouse Pump. By the use of these cups, the saving in wear and tear of machinery and the additional power gained is simply wonderful, as is proved by actual results.*

We solicit a practical test, and will send one or more valve and air-brake cups to responsible parties on 30 days' trial. Details and drawings showing manner of attachment and prices furnished on application.

DETROIT LUBRICATOR CO.

Office: 129 GRISWOLD ST., - - - DETROIT, MICH.

* Numerous examples can be furnished where engines have run *two years and over, without having had their valves faced.* The average mileage for the air-brake lubricator is 500 to 1,500 miles to the ¼ pint, and example can be given where this mileage has been greatly exceeded, among which is one of 1,612 *miles with a ¼ pint* of oil on a daily run of 208 miles with 64 stops. This pump has run *nine months without having had* 25 *cents expended on it for repairs.*

HALE & KILBURN MANUFACTURING COMP'Y,

48 AND 50 NORTH SIXTH STREET, PHILADELPHIA, PA.,

EXTENSIVE MAKERS OF

PATENTED CAR SEATS AND SPRINGS.

REFERENCES.
N. Y. C. & H. R. R. CO.
N. Y. ELEVATED R. R.
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PULLMAN P. C. CO.
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AND ONE HUNDRED OTHERS.

ELASTIC SLAT SEAT.

RATTAN SPRING SEAT.

SPRING EDGE SEAT.

ESTIMATES, CIRCULARS AND SAMPLES FURNISHED ON APPLICATION.

PARLOR CAR CHAIR.

Kansas & Gulf Short Line R. R. 33 m. 2 lo. 32 cars
Kill Culverhouse, *Gen. Man.* ..... Tyler, Tex.
Kinderhook, *Pur. Agt.* ..... New York, N. Y.
K. K. Stevenson, *Sec. Buf., N. Y. & Phil.*
Kendall & Eldred R. R. 4 8-4 g. 27 m. 2 lo. 10 cars
Kent Northern Ry ..... 4 8-4 g. 27 m. 2 lo. 10 cars
J. C. Brown, *Gen. Man.* ..... Richibucto, N. B.
Kentucky Central R. R. 4 8-4 g. 184 m. 12 lo. 640 cars
G. W. Bender, *Supt.* ..... Covington, Ky.
W. T. Smith, *M. of Mach.* ..... Covington, Ky.
C. C. B. ..... Covington, Ky.
Kentucky & South Atlantic Ry. 3 g. 23 m. 3 lo. 52 c
Kepler's Hand Harper, *Supt. & P. A.* Mt. Sterling, Ky.
S. P. Hatfield, *M. M.* ..... Mt. Sterling, Ky.
Keokuk & Des Moines R.R. *(See Burl., N. Y. & Phila.)*
Kinzua R. R. *(See Buf., N. Y. & Phila.)*
Kingston & Pembroke Ry. 4-8½ g. 90 m. 9 lo. 214 c
B. W. Folger, *Supt.* ..... Kingston, Ont.
J. H. Taylor, *Pur. Agt.* ..... Kingston, Ont.
J. H. Taylor, *M. M.* ..... Kingston, Ont.
Knox & Lincoln R. R. 4-8½ g. 49 m. 5 lo. 103 cars.
C. A. Coombs, *Supt.* ..... Bath, Me.
Wm. A. Field, *M. M.* ..... Bath, Me.
C. L. Turner, *M. C. B.* ..... Bath, Me.
Knoxville & Augusta R. R. 5 g. 16 m. 2 lo. 4 cars
R. N. Hood, *Gen. Man. & P. Agt.* Knoxville, Tenn.

L

Lackawanna & Pittsburgh R. R. 3 g. 97 m
R. M. Patterson, *Gen. Man.* ..... Angelica, N. Y.
Lake Champlain & Moriah R. R. 4 8-4 g. 8 m 8 lo. 22 cars
E. R. Hedding, *Supt.* ..... Port Henry, N. Y.
Lake Erie & Western Ry. 4 8-4 g. 388 m. 10 lo. 1,701 c.
J. H. Cheney, *Gen. Man.* ..... Bloomington, Ill.
D. S. Hill, *Gen. Supt.* ..... Bloomington, Ill.
T. H. Perry, *Pur. Agt.* ..... Bloomington, Ill.
H. L. Cooper, *Supt. of Equipment* ..... Lima, O.
Lake George & Muskegon Navigation Co.
4-8½ g. 20 m. 4 lo. 70 cars.
W. S. Gerrish, *Gen. Man.* ..... Muskegon. Mich.
Lake Shore & Michigan So'n Ry.
4-8½ g. 1,340 m. 547 lo. 17,115 cars.
John Newell, *Gen. Man.* ..... Cleveland. O.
P. P. Wright, *Gen. Supt.* ..... Cleveland, O
L. G. Higgins, *Pur. Agt.* ..... Cleveland, O.
G. W. Stevens, *Supt. M. P.* ..... Cleveland, O.
John Kirby, *Gen. M. C. B.* ..... Cleveland, O.
East'n Div. C. B. Quash, *Supt.* ..... Cleveland, O.
J. S. Graham, *M. M.* ..... Buffalo, N. Y.
A. C. Robson, *M. C. B.* ..... Buffalo, N. Y.
L. D. Gassett, *M. M.* ..... Cleveland, O.
J. Withycombe, *M. C. B.* ..... Cleveland, O.
Frank. Div. G. H. McIntire, *Supt.* Youngstown, O.
Toledo Div.: Thos. Flesher, Jr., *Supt.* Cleveland, O.
J. M. Sanborn, *M. M.* ..... Cleveland, O.
W. O. Smith, *M. C. B.* ..... Norwalk, O.
Mich. Div., J. E. Curtis, *Supt.* ..... Detroit, Mich.
Det. Riv., T. J. Charlesworth, *Supt.* Detroit, Mich.
Lansing, Ypsilanti & Ft. Wayne Branches,
W. H. Cadil, *Supt.* ..... Detroit, Mich.
Western Div.: A. G. Amsden, *Supt.* ..... Chicago, Ill.
W. L. Gilmore, *M. M.* ..... Elkhart, Ind.
P. L. Biss. ..... Adrian, Mich.
Gr. Rap. Br., M. E. Wattles, *Supt.* Kalamazoo, Mich.
Lake Sup. R. R. 3 g. 10 m. 4 lo. 4 cars.
D. L. Bliss. ..... Carson, Nev.
John T. Rogers, *Gen. Supt.* ..... Carson, Nev.
Geo. R. Lindsay, *M. M.* ..... Carson, Nev.
Leavenworth, Topeka & So. W. Ry *(See A. T. & S. F.)*
Leal Rds., J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
W. C. Alstyne, *Gen. Man.* ..... Albany, N. Y.
W. H. Hawkins, *Pur. Agt* ..... Albany, N. Y.
Geo. Tefft, *M. M.* ..... Chatham, N. Y.
Lehigh Valley R. R. 4-8½ g. 495 m. 392 lo. 36,966 c.
H. S. Goodwin, *Gen. Supt.* ..... Bethlehem, Pa.
W. C. Alderson, *Pur. Agt.* ..... Philadelphia, Pa.
John I. Kinsey, *M. M.* ..... Easton, Pa.
John S. Lentz, *M. C. B.* ..... Packerton, Pa.
N. J. Div.: Jas. Donnelly, *Supt.* Perth Amboy, N. J.
Grinnell Burt, *Gen. Man.* ..... Warwick, N. Y.
Y. L. Furman, *Supt.* ..... Warwick, N. Y.
John Sayre, *Pur. Agt.* ..... Warwick, N. Y.
N. L. Furman, *Supt.* ..... Warwick, N. Y.
S. Mills, *M. M.* ..... Warwick, N. Y.
Lehigh & Lackawanna and Lehigh & Susquehanna
R. Rs. *(See Phil. & Read.; N. J. Cen. Div.)*
Lewis & Kennebec R. R. *(See Somer Cen.)*
Litchfield, Carrollton & Western R. R. 4-8½ g. 22 m.
H. S. Carroll *Prest. & G. Man.* ..... Carrollton, Ill.
Coal Rds., J. I. Blakeslee, *Supt.* Mauch Chunk, Pa.
Thos. A. Mellon, *Gen. Manager* ..... Pittsburg, Pa.
Geo. Senft, *Supt. & Eng.* ..... Latrobe, Pa.
Little Miami R. R. *(See Penna. Co.'s Rds.; (S) Div.)*
Little Rock, Miss. River & Texas Ry
4-8½ g. 170 m. 12 lo. 362 cars.
H. Wood, *Gen. Man.* ..... Little Rock, Ark.
F. A. Lister, *Gen. Supt.* ..... Little Rock, Ark.
F. Hufsmith, *M. M. & C. B.* Arkansas City, Ark
Little Rock & Fort Smith, 4-8½ g. 170 m. 12 lo. 360 c
Hy. Wood, *Gen. Man.* ..... Little Rock, Ark.
F. A. Lister, *Gen. Supt.* ..... Little Rock, Ark.
F. Hufsmith, *M. M. & C. B.* Arkansas City, Ark.
Little Saw Mill Run R. R. 3 & 4-8½ g. 8 m 4 lo. 37 c.
T. Hartley, *Gen. Man.* ..... Pittsburg, Pa.
Long Island R. R. 4-8½ g. 372 m. 92 lo. 953 cars.
I. D. Barton, *Gen. Supt.* Long Island City, N. Y.
Benj. Norton, *Pur. Agt.* Long Island City, N. Y.
C. H. Thompson, *M. M.* Long Island City, N. Y.
Longview & Sabine Valley R. R. *(See Tex. & N. O.)*
Louisiana Western R. R. *(See Pac. R. of Mo.; (L) Div.)*
Louisville, Cin. & Lexington R. R. *(See Louis. & N.)*
Louis, Evans & St. L. R. R. 4-8½ g. 234 m. 10 lo. 1,032
Geo. T. Evans, *Gen. Man.* ..... Louisville, Ky.
C. F. Dalton, *Gen. Supt.* ..... Louisville, Ky.
F. Bodtman, *M. M.* ..... Evansville, Ind.
Louisville, New Albany & Chicago Ry.
4-8½ g. 470 miles 50 lo. 3,700 cars.
John B. Carson, *Gen. Supt.* ..... Chicago, Ill
T. L. Dunn, *Gen. Supt.* ..... Chicago, Ill.
H. O. Pratte, *Pur. Agt.* ..... Chicago, Ill.
Josiah Bettis, *M. M. & C. B.* ..... New Albany, Ind.
Lafayette Div., *Supt.* ..... Lafayette, Ind.
Louisville, New Orleans & Tex. Ry. 450 m. in progress.
Jas. M. Edwards, *Gen. Man.* ..... Memphis, Tenn.
E. D. Anderson, *M. M.* ..... Memphis, Tenn.
John Bradley, *Div. Supt.* ..... New Orleans, La.
No. Div.: C. J. Birdsong ..... Louisville, Ky.
Louisville & Nashville R. R.
5 g. 2,186 m. 960 lo. 12,197 cars.
J. T. Hanson, *Gen. Man.* ..... Louisville, Ky.
W. P. Harris, *Supt.* ..... Louisville, Ky.
P. P. Hinkle, *Pur. Agt.* ..... Louisville, Ky.
Reuben Wells, *Supt. Mach.* ..... Louisville, Ky.
Louisv., Cin. & Lex. Div.,
J. G. Metcalf, *Supt. Trans.* ..... Louisville, Ky.
P. Leola, *M. M.* ..... Louisville, Ky.
J. W. Luttrell, *M. M.* ..... Louisville, Ky.
J. G. Clifford, *M. M.* (2d & C. Div.) Bowling Grn., Ky.
Henderson Div., J. Geddes, *Supt.* Henderson, Ky.
W. P. Pike, *M. M.* ..... Nashville, Tenn.
Nash. & D. Div.: J. Geddes, *Supt.* Nashville, Tenn.
S. & N. A. Div.: ..... Birmingham, Ala.
C. W. White, *M. M.* ..... Birmingham, Ala.
Mob. & M. S. Div. Penn. & Sel., H. Mont. Ft. Rs.: ..... Mobile, Ala.
M. S. Belknap, *Supt.* ..... Montgomery, Ala.
N. & M. Div. W. Conaway, *Supt.* Memphis, Tenn.
J. Y. Slusser, *M. M.* ..... Memphis, Tenn.
St. L. Div.: C. O. Parker, *Supt.* Mo. Agency, Ala.
Thos. Walsh, *M. M.* ..... Mt. Vernon, Ill
Pensacola and So. Div. Penn. & Selma Rds.:
E. O. Saltonstall, *Supt.* ..... Pensacola, Fla.
W. D. Robb, *M. M.* ..... Pensacola, Fla.
Louisville & Wadley R. R. 5 g. 10 m. 1 lo. 5 c.
J. H. Wilkins, *Supt. & Pur. Agt.* Louisville, Ga.

M

Macon & Brunswick R. R. *(See E. Tenn., Vir. & Ga.; At. & Ga. Divs.*
Maine Central R. R. 4-8½ g. 405 m. 59 lo. 1,393 c

Payson Tucker, *Gen. Man.* ..... Portland, Me.
Waterville, Me.
Ira K. Russell, *M. M.* ..... Augusta, Me.
D. H. Kenison, *M. C. B.* ..... Eastern Maine.
3 g. 19 m. 7 lo. 40 c.
L. L. Lincoln, *Supt.* ..... Portland, Me.
Manchester & Keene R. R. 4-8½ g 30 m. *(See Concord.)*
Manchester & Lawrence R. R. *(See Concord.)*
Manchester & North Weare R. R.
Manhattan Ry. 4-8½ g. 22 m. 228 lo. 952 pass. c.
Frank K. Hain, *Gen. Man.* ..... New York, N. Y.
W. T. Goundie, *Supt. Trans.* ..... New York, N. Y.
T. W. Peeples, *M. M.* ..... New York, N. Y.
H. A. Webster, *M. C. B.* ..... New York, N. Y.
Manhattan, Alma & Burlingame Ry. *(See A., T. & S. F.)*
Manitoba Southwestern Colonization Ry
4-8½ g. 57 m. 3 lo. 155 cars.
J. M. Eagan. *Gen. Supt.* ..... Winnipeg, Man.
Chas. Newell, *M. M.* ..... Winnipeg, Man
Marietta & Cincinnati R. R. *(See Cin. Wash. & Balt.)*
Marietta & North Georgia R. R. 3 g. 60 m. 3 lo. 7 c.
J. B. Glover, *Supt. & P. Agt.* ..... Marietta, Ga.
E. A. Withers, *M. M.* ..... Marietta, Ga
Marquette, Houghton & Ontonagon R. R.
4-8½ g. 100 m. 42 lo. 2,530 cars.
John Hornby, *Gen. Man.* ..... Marquette, Mich
M. B. McGee, *Pur. Agt.* ..... Marquette, Mich.
W. A. Thompson, *M. M.* ..... Marquette, Mich
H. B. Lyons, *M. C. B.* ..... Marquette, Mich
Maryland Central R. R. 3 g. 27 m. 4 lo. 56 cars.
S. G. Boyd, *Supt.* ..... Baltimore, Md.
Marquette & Western
D. McCool, *Gen. Supt.* ..... Marquette, Mich.
C. H. Kent, *Pur. Agt.* ..... Marquette, Mich.
Massachusetts Central R. R. 4-8½ g. 48 m. 5 l. 81 c
E. G. Allen, *Supt. & Pur. Agt.* ..... Worcester, Mass.
E. A. Stone, *M. M.* ..... So. Sudbury, Mass.
McComb, Deshler & Toledo R. R.
See Cin., Han. & Day.; D. & M. Div.
Meadville Ry. *(See Penna. Co.'s Rds.; (S) Div.)*
Memphis & Charleston R. R. *(See E. Tenn., Vir. & Ga.)*
Memphis & Lit. Rock R. R. 3 g. 135 m. 14 lo. 209 c.
R. Fink, *G. Man. & P. A.* ..... Little Rock, Ark.
H. G. Fleming, *Supt.* ..... Memphis, Tenn.
Thos. Rennell, *M. M.* ..... Argenta, Ark.
T. Rennell, *M. C. B.* ..... Argenta, Ark.
Mexican Ry. 4-8½ g. 203 m. 42 lo. 616 cars.
E. W. Jackson, *Gen. Man.* ..... Mexico, Mex.
Mexican Central Ry. 4-8½ g. 680 m. 710 lo. 816 c.
Theo. Nickers n, *Pur. Agt.* ..... Boston, Mass.
D. B. Robinson, *Gen. Man.* ..... City of mexico
D. McKenzie, *Gen. Sup.* ..... City of Mexico
J. H. O'Brien, *M. M.* ..... City of Mexico
H. G. Jarvis, *Sup.* ..... City of Mexico
J. H. Smith, *Div. Supt.* ..... Silao, Mex.
Wm. Davis, *Div. Supt.* ..... Jimulco, Mex
E. S. Kent, *Div. Supt.* Paso del Norte. Mex
F. W. Johnstone, *Supt. R. S.* ..... City of Mexico
R. P. Simpson, *M. M.* ..... City of Mexico
A. Hende., *M. M.* ..... Calera, Mex
C. Stewart, *M. M.* ..... Jimulco, Mex.
W. L. Wallace, *M. M.* ..... Chihuahua, Mex.
J. G. McQuen, *M. M.* ..... Chihuahua, Mex.
San Blas Div.: T. Payne, *Sup.* San Blas, Mex.
1st Div.: G. T. Jarvis, *Supt.* ..... City of Mexico
2d Div.: J. H. Smith, *Supt.* ..... Silao, Mex.
3d Div.: W. Davis, *Supt.* ..... Jimulco, Mex
4th Div.: R. E. Comfort, *Supt.* Paso Del Norte, Mex
Mexican National Ry. 4-8½ g. 766 m. 50 lo. 1,283 c
Texas Mexican Ry 3 g. 171 m. 10 lo. 212 c
R. G. Peebles, *Supt.* ..... Laredo, Tex.
W. F. Baldwin, *Asst. Supt.* ..... Laredo, Tex.
Galv. Div. T. M. Hy.: M. Quin, *Supt.* Galveston, Tex.
Yo. Div. Mex. Nat. Ry. & So. Pac. of Tex. Ry
C. A. Merriam, *supt.* ..... Laredo, Texas
Tho. Wilan, *M. M.* ..... Corpus Christi, Tex.
So. Div. of N. Ry.: W. E. Lewis, *Supt.* Mexico, Mex
J. M. Winslow, *M. M.* ..... Mexi o, Mex
Mat. Div.: F. E. Butterfield, *Supt.* Matamoras, Mex
Mexican, Oriental. Inter-Oceanic & International-nal R. R.
G. M. Dodge, *Pres.* 193 B'way, New York, N. Y.
Michican Cen. R. R. 4-8½ g. 485 m. 357 lo. 11,284 c.
H. B. Ledyard, *Pres. & Gen. Man.* ..... Detroit, Mich.
E. C. Brown, *Gen. Supt.* ..... Detroit, Mich.
Robert Miller, *Asst. Gen. Supt.* ..... Detroit, Mich.
Allan Boutin, *Pur. Agt.* ..... Detroit, Mich.
S. H. Edgerly, *Gen. M. M.* ..... Jackson, Mich.
(1) Lines West of Detroit River:
E. C. Brown, *Gen. Supt.* ..... Detroit, Mich.
East. Div.: S. Bissell, *Supt.* Detroit, Mich.
Bay City, Saginaw & Mackinaw Divisions.:
W. A. Vaughan, *Supt.* ..... Bay City, Mich.
C. E. Smart, *M. M.* ..... Bay City, Mich.
Main Line: Gr. Rap.; So. Bend; and So. Hv. Divs.:
C. H. Bush, *Supt.* ..... Jackson, Mich.
W'n Div.: R. H. L'Hommedieu, *Supt.* Chicago, Ill.
(2) Lines East of Detroit River:
Wm. H. Perry, *Agt.* ..... Buffalo, N. Y.
J. E. Morford, *Supt.* ..... St. Thomas, Ont.
A. Hoch, *M. M.* ..... St. Thomas, Ont.
Rob't Potts, *M. C. B.* ..... St. Thomas, Ont.
Michigan & Ohio.
Luther Allen, *Supt.* ..... Toledo, O.
H. H. Mitchell, *Pur. Agt.* ..... Toledo, O.
D. J. Purnell, *M. M.* ..... Marshall, O.
Middleburg & Schoharie; and
Schoharie Valley R. Rs. 4-8½ g. 11 m. 2 lo. 6 cars
C. H. Bush, *Supt.* ..... Middleburg, N. Y.
(See transd Divisn.)
Midland Ry. Carolina Ry. 5 g. 95 m. 3 lo. 22 m.
Atlantic & North Carolina Ry. 22 m.
John D. Whitford, *Gen. Man.* ..... Newbern, N. C.
J. A. Bryan, *Supt.* ..... Newbern, N. C.
D. J. Sprague, *Pur. Agt.* ..... Newbern, N. C.
S. Manly, *Supt. of Mach.* ..... Newbern, N. C.
(Oper. by Rich. & Danville.)
Milton & Sutherlin.
Milwaukee, Lake Shore & Western Ry.
4-8½ g. 370 m. 45 lo. 1,930 cars.
H. G. H. Reed, *Gen. Man. & P. Agt* Milwaukee, Wis
J. Donahoe, *Supt.* ..... Milwaukee, Wis
David B. Curtis, *Asst. Supt.* ..... Oshkosh, Wis
John Hickey, *M. M.* ..... Ledyard, Wis
Milwaukee Northern and Wisconsin & Michigan R. Rds. 4-8½ g. 228 m. 24 l. 703 cars
C. F. Dutton, *Gen. Supt.* ..... Milwaukee, Wis.
N. S. Kimball, *M. M.* ..... Ft. Howard, Wis.
Mineral Range R. R. 3 g. 13 m. 3 lo. 43 cars
Chas. E. Holland, *Pr. & Supt.* ..... Hancock, Mich.
W. H. Carr, *Pur. Agt.* ..... Hancock, Mich.
T. J. Shellman, *M. C. B.* ..... Hancock, Mich.
Minneapolis, Lyndale & Minnetonka Ry.
3 g. 20 miles 4 motors 1 lo. 30 cars.
William McGregor, *Gen. Man.* ..... Minneapolis, Minn
T. W. Heintzelman, *M. M.* ..... Minneapolis, Minn.
Mississquoi R. R. St. Albans, Vt.
W. C. Smith, *Man.* ..... St. Albans, Vt.
Mississippi, Terre Aux Boeufs & Lake R. R.
20 miles.
M. R. Snelman, *Supt.* ..... New Orleans, La.
Mississippi & Tenn. R. R. 4-8½ g. 103 m. 10 lo. 194 c.
M. Burke. *Gen. Supt.* ..... Memphis, Tenn
J. C. Ramsey, *M. M.* ..... Memphis, Tenn.
S. J. Bolce, *M. C. B.* ..... Memphis, Tenn.
Missouri, Kansas & Texas Ry. *(See Mo. Pac.; (2) Div.)*
Missouri Pacific Ry. Leased and controlled lines.
4-8½ g. 0,020 m. 697 lo. 10,748 cars.
H. M. Hoxie, *Vice Pres.* ..... St. Louis, Mo.
R. B. Lyle, *Pur. Agt.* ..... St. Louis, Mo.
(1). (2) and (3) Divs.:
John Hewitt, *Asst. M. P. & M.* ..... St. Louis, Mo.
John Hodge, *Supt. Car Dep.* ..... St. Louis Mo.
Frank Howard, *Asst. Supt. C. D.* Mar shall, Tex
(4), (5) and (6) Divs.:
O. A. Hayn's, *Asst. M. P. & M.* ..... Marshall, Tex.
(1) Missouri Pacific Ry. 1,028 m. 155 lo. 4,218 cars.
A. M. Hagar, *Supt.* ..... Sedalia, Mo.
E. Taylor, *M. M.* ..... Sedalia, Mo.
Div. No.: A. M. Hagar, *Supt.* ..... Sedalia, Mo.
(2) Mo., Kan. & Tex. Ry. 1,308 m. 140 lo. 4,248 cars.
S. Irvin, *Asst. Supt. Car Dep.* ..... Sedalia, Mo.
J. B. Vandyne, *Supt.* ..... Parsons, Kan.
J. W. Haines, *M. M.* ..... Parsons, Kan.
(3) Central Branch Un. Pac. R. R. 388 m. 30 lo. 509 c.
W. W. Fagan, *Supt.* ..... Atchison, Kan.
H. V. Faries, *M. M.* ..... Atchison, Kan.
J. W. Blackburn, *Asst. Supt. Car D.* Atchison, Kan.
(4) St. L. I. M. & So'n Ry. 905 m. 138 lo. 4,078 c.
Wm. Kerrigan, *Supt.* ..... St. Louis, Mo.
St. Louis Div.: W. H. Harris, *M. M.* De Soto, Mo.
Ark. Div.: *Supt.* ..... Little Rock, Ark.

R. M. Richardson, *M. M.* ..... Little Rock, Ark.
(5) Int. & G. No.: John Herrin, *Supt.* Palestine, Tex
W. S. Morris, *M. M.* ..... Palestine, Tex.
(6) Tex. & Pac. ..... Marshall, Tex.
E. N. O. & Tex. Cont. Divs.:
Geo. Hinick, *Supt.* ..... Marshall, Tex.
E. A. Haggerty, *M. M.* ..... Marshall, Tex.
E. R. Smith, *M. M. & M. C. B.* ..... Orleans, La.
Rio Grande Div.:
L. L. Keller, *Supt.* ..... Big Springs, Tex.
E. A. Haggerty, *M. M.* ..... Big Springs, Tex.
Mobile & Ala. Grand Trunk R. R. 5 g. 59 m. 2 lo. 23 c.
Ala. Div. H. Pratt, *Trustee* ..... Mobile, Ala.
Mobile & Girard R. R. 5 g. 84 m. 7 lo. 112 cars
W. L. Smith, *Gen. Supt.* ..... Columbus, Ga.
J. C. Albrecht, *M. M.* ..... Columbus, Ga.
A. J. Nix, *M. C. B.* ..... Columbus, Ga.
Mobile & Montgomery Ry. *(See Louis. & Nash.)*
Mobile & Northwestern R. R. 3 g. 31 m. 2 lo. 16 c.
Thomas T. Lyons, *Pres.* ..... Glendale, Miss.
Mobile & Ohio R. R. 5 g. 528 m. 75 lo. 1,353 cars.
G. Jordan, *V. Pr. & Gen. Man.* ..... Mobile, Ala.
F. Jordan, *Pur. Agt.* ..... Mobile, Ala.
M. T. Carson, *Gen. M. M.* ..... Whistler, Ala.
S. J. Hubbard, *M. C. B.* ..... Whistler, Ala.
So'n Div.: J. G. Motley, *Supt.* ..... Mobile, Ala.
L. J. Morris, *M. M.* ..... Macon, Miss.
No'n Div.: G. Hosford, *Supt.* ..... Jackson, Tenn.
H. C. Goode, *M. M.* ..... Jackson, Tenn.
Mobile & Spring Hill R. R. 3-2 g. 8 m. 1 lo. 2 cars
F. Ingate, *Manager* ..... Mobile, Ala.
Moline & Southeastern R. R. 3-6 g. 8 m. 1 lo. 26 c.
R. Battersly, *Gen. Man.* ..... Coal Valley, Ill.
Mont Alto R. R. 4-9 g. 21 m. 2 lo. 5 cars.
G. B. Westling, *Supt. & P. A.* ..... Mont Alto, Pa.
Montgomery & Eufaula Ry. *(See Cen. of Ga.)*
Montgomery Southern R. R. 3 g. 20 m. 1 lo. 15 cars.
S. D. Hubbard, Jr., *Gen. Man.* Montgomery, Ala.
Montour R. R. 4-8½ g. 12 m. 2 lo. 136 cars.
T. G. Brown, *Supt.* ..... Imperial, Pa.
Henry Newman, *M. C. B.* ..... Imperial, Pa.
Montpelier & Wells River R. R. 4-8½ g. 38 m. 3 lo. 86c.
W. A. Stowell, *Supt.* ..... Montpelier, Vt.
Montreal Portland & Boston Ry.
4-8½ g. 47 m. 4 lo. 35 c.
C. A. Armstrong, *G. M. & Pur. Agt* Sorel, Que.
J. F. Armstrong, *Gen. Supt.* ..... Sorel, Que.
G. W. Pangborn, *M. M.* ..... Sorel, Que.
Montrose Ry. 3 g. 28 m. 3 lo. 30 cars.
T. G. Walter. *Gen. Supt.* ..... Tunkhannock, Pa.
Morgan's Louis. & Tex. R. R. 4-8½ g. 242 m. 461 l. 359 c
T. Kruttschnitt, *Gen. Man.* ..... New Orleans, La.
C. Trumpy, *Pur. Agt.* ..... New Orleans, La.
J. D. Connell, *M. M.* ..... Algiers, La.
Jno. Hollenbeck, *M. C. B.* ..... Algiers, La.
Mount Washington R. R. 5-3 g. 3 m. 6 lo. 6 cars
Hon. Randall A. Gen. Man. ..... Hinsdale, N. H.
Muncy Creek Ry. *(See Wmspt. & No. Br.)*

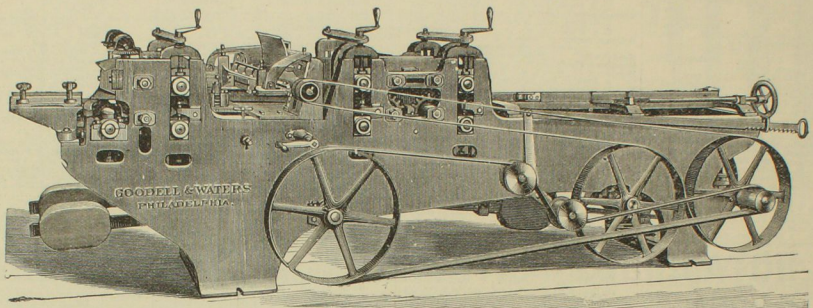
N

Nantasket Beach R. R. 4-8½ g. 6 m. 5 lo. 25 c.
George L. Keyes, *Gen. Supt.* ..... Boston, Mass.
Naugatuck R. R. 4 8-4 g. 4 m. 2 l. 547 cars.
Geo. W. Beach, *Supt.* ..... Waterbury, Conn.
H. A. Bishop, *Pur. Agt* ..... Bridgeport, Conn.
Hy. P. Bruce, *M. M.* ..... Bridgeport, Conn.
Napanee, Tamworth & Quebec Ry. In progress.
Ed. W. Rathbun, *Man. Agt.* ..... Deseronto, Ont.
R. C. Carter, *Supt.* ..... Deseronto, Ont.
Narragansett Pier R. R. 4-8½ g. 9 m. 1 lo. 20 c.
C. J. Langhear, *Supt. & Pur. Agt.* Peacedale, R.I.
Nashua & Rochester R. R. *(See Wor. & Nash.)*
Nashville, Chattanooga & St. Louis Ry.
5 g. 559 miles 87 lo. 1,979 cars.
J. W. Thomas, *G. Man. & P. Agt.* Nashville, Tenn.
J. C. Bond, *Gen. Supt.* ..... Nashville, Tenn.
James Cullen, *M. M. & C. B.* ..... Nashville, Tenn.
Nashville & Florence R. R. 5 g. 20 m.
J. T. Craik. *Supt.* ..... Columbia, Tenn
Natchez, Jackson & Col. R. R. 3-6 g. 100 m. 7 lo. 86 c.
Natchez, Miss.
National Car Company ..... 4,000 freight cars.
L. Mills, *Pres.* ..... Detroit, Mich.
F. Stewart Stranahan, *Sec. & Tr.* St. Albans, Vt.
John B. Fletcher, *Supt* ..... Detroit, Mich.
Nebraska, Pacific Junction & Memphis R.R. 4-8½ g. 16 m.
H. M. Clarke, *Gen. Man.* ..... Girard, Kan.
Allan Boutin, *Gen. Supt.* ..... Girard, Kan.
Nevada Central R. R. *(See Union Pac.; (7) Div.)*
Nevada County Nar. R. R. 3 g. 23 m. 4 lo. 4 cars.
Geo. T. Kidder, *Supt.* ..... Grass Valley, Cal.
Jas McCormick, *M. M. & C. B.* Grass Valley, Cal.
Nevada & Oregon Ry. ..... Reno, Nev.
D. W. Balch *Supt* ..... Reno, Nev.
New Brunswick Ry. 4-5½ g. 419 m. 20 lo. 1,000 cars.
E. R. Wood, *Gen. Man.* ..... Woodstock, N. B.
Jesse Mathews, *M. M.* ..... Gibson, N. B.
T. N. Burpee, *M. C. B.* ..... McAdam Junc., N. B.
J. J. Seely, *Pur. Agt.* ..... Woodstock, N. B.
Thos. Armstrong, *M. M.* ..... St. Andrew's, N. B.
G. Houlton, *M. C. B.* ..... St. Andrew's, N. B.
New Brunswick & Can. Ry. *(See New Brun.)*
Newburg, Dutchess & Conn. R. R.
C. L. Kimball, *Supt. & P. Agt.* Matteawan, N. Y.
W. G. Van Buskirk, *M. M.* ..... Matteawan, N. Y.
New Castle R. R. ..... New Castle, Pa.
Jno. Gibson, *Gen. Man.* ..... New Castle, Pa.
New Castle & Beaver Valley R. R. *(See Penna. Co.)*
New Haven & Derby R. R. 4-8½ g. 12 m. 2 lo. 22 cars.
E. S. Quintard, *Supt.* ..... New Haven, Conn.
New Haven & Northampton. 4-8½ g. 170 m. 27 lo. 908 c.
S. B. Opdyke, Jr., *Supt.* ..... New Haven, Ct.
Wm. Hoadley, *Pur. Agt.* ..... New Haven, Ct.
Henry Fox, *M. M.* ..... New Haven, Ct.
John Sweeney, *Car. Ships* ..... New Haven, Ct.
New Jersey & New York Ry. 4-8½ g. 37 m. 6 lo. 40 c.
J. D. Hasbrouck, *Gen. Man.* ..... Jersey City, N. J.
J. D. Drake, *Supt of Trans.* ..... Hillsdale, N. J.
H. D. Van Wagonen, *M. C. B.* ..... Hillsdale, N. J.
N. J. Southern R. R. *(See Del., L. & W.)*
New London Northern R. R. *(See Central Ver.)*
New Orl ans, B. Rouge, Vicks. & Memphis.
M. D. Howard, *Gen. Man.* ..... New Orleans, La.
John B. Adley, *Supt.* ..... New Orleans, La.
New Orleans Pacific Ry. *(See Mo. Pac.; (6) Div.)*
New Orleans & Carrollton R. R.
4-8½ g. 13 m. 12 lo. 70 cars.
C. V. Hall, *Supt.* ..... New Orleans, La.
John Dahmer, *M. M.* ..... New Orleans, La.
Jas. Thorne, *M. C. B.* ..... New Orleans, La.
New Orleans & Mobile R. R. *(See Louis. & Nash.)*
N. O. & Northeastern R. R. *(See Miss., M. & Tenn. R.)*
New Orleans & Texas Ry. 5 g. 21 m. 1 lo. 8 cars.
L. B. Schofield, *Supt.* ..... Selma, Ala.
Newport & Richford R. R. 4-8½ g. 22 m.
Reo. Warren, *Supt.* ..... Newport, R. I.
N. Y. Central & Hudson River R.R.
4-8½ g. 960 m. 970 lo. 35,101 cars.
J. M. Toucey, *Gen. Supt.* ..... New York, N. Y.
Chas. Dorner, *Pur. Agt.* ..... New York, N. Y.
Wm. Buchanan, *Supt. M. P.* ..... New York, N. Y.
L. Garey, *Supt. Car Dep.* ..... New York, N. Y.
N. Y. & Buf. Div.: C. M. Bissell, *Supt.* ..... do.
P. McQ. Gibson, *M. M.* ..... New York, N. Y.
Hud. Riv. Div.: J. Tracy, *Supt.* ..... West Albany, N. Y.
W. H. Wolfrath, *M. C. B.* ..... New York, N. Y.
E'n Div.: Zenas C. Prest, *Supt.* ..... West Albany, N. Y.
John Orton, *M. M.* ..... West Albany, N. Y.
L. Packard, *M. C. B.* ..... West Albany, N. Y.
W'n Div.: A. Browne, *Supt.* ..... Syracuse, N. Y.
S. L. White, *M. M.* ..... Syracuse, N. Y.
Amos Gould, *M. M.* ..... Rochester, N. Y.
E. Chamberlain, *M. C. B.* ..... E. Buffalo, N. Y.
Peter Smith, *M. C. B.* ..... E. Rochester, N. Y.
Jno. Mackenzie, *M. C. B.* ..... Niagara Falls, N. Y.
N. Y. Chic. & St. L. Ry. 4-8½ g. 513 m. 11.5 lo. 4,838 c.
Lewis Williams, *Gen. Man.* ..... Cleveland, O.
Jno. Mackenzie, *Supt. M. P.* ..... Cleveland, O.
East'n Div. G. H. Kimball, *Supt.* ..... Cleveland, O.
W. H. Canfield, *M. M.* ..... Conneaut, O.
West'n Div.- A. H. Evans, *Supt.* ..... Chicago, Ill.
Jas. Eckford, *M. M.* ..... Bellevue, O.
New York City & Northern. 4-8½ g. 54 m. 17 lo. 368 c.
Frank S. Gannon, *Gen. Supt.* High Bridge, N. Y.
Tho. Millen, *M. M.* ..... High Bridge, N. Y.
New York, Lackawanna & W'n Ry. *(See Del., L. & W.)*
New York, Lake Erie & Western R. R.
See N. Bowen, *Pr. Pr.* ..... New York, N. Y.
(1) N. Y., L. E. & W. Div. 4-8½ g. 1,073 m. 370 lo. 20,553c
H. Thomas, *Gen. Supt.* ..... Jersey City, N. J.
J. A. Hardenburgh, *Pur. Agt.* New York, N. Y.

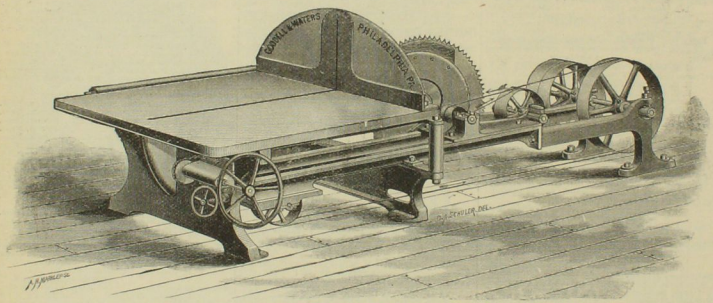
F. M. Wilder, *Supt. M. P. & M.* ..... Susqueh'a. Pa.
E'n Div.: E. O. Hill, *Supt.* ..... Jersey City, N. J.
J. H. Vreeland, *M. M.* ..... Jersey City, N. J.
J. N. Mileham, *M. C. B.* ..... Jersey City, N. J.
Del. Div.: W. J. Murphy, *Supt.* ..... Port Jervis, N. Y.
J. Van Vechten, *M. M. & C. B.* Pt. Jervis, N. Y.
Susq. Div.: J. Jolls, *Supt.* ..... Elmira, N. Y.
W. Blackburn, *M. M.* ..... Susquehanna, Pa.
D. B. Goodell, *M. C. B.* ..... Elmira, N. Y.
Buf. & D. Div.: *Supt.* ..... and
G. B. Ross, *M. M.* ..... Buffalo, N. Y.
C. Wilder, *M. C. B.* ..... Buffalo, N. Y.
B. & S.-W. Div.: C. A. Brunn, *Supt* ..... do.
W'n Div.: W. B. Coffin, *Supt.* Hornellsville, N. Y.
C. L. Griggs, *M. M.* ..... Hornellsville, N. Y.
N. Y. & Greenwood L. Ry. 4-8½ g. 4 m. 8 lo. 53 c.
Stephen Smith, *Supt.* ..... Elmira, N. Y.
F. A. Stinard, *M. M.* ..... Pompton, N. J.
(2) N. Y., Pa. & O. Div.: 4-8½ g. 565 m. 240 lo. 7,794 c.
S. M. Felton, *Gen. Man.* ..... Cleveland, Ohio.
J. M. Ferris, *Jr., Gen. Supt.* Cleveland, Ohio.
J. H. Howay, *Pur. Agt.* ..... Cleveland, Ohio.
Wm. Fuller, *Gen. M. M. & C. B.* Cleveland, O.
S. V. Smith, *Asst. Gen. M. C. B.* ..... Kent, Ohio.
E'n div.: A. Dunbar, *Supt.* ..... Meadville, Pa.
J. A. Cooper, *M. M.* ..... Meadville, Pa.
D. S. Stockbridge, *M. C. Rep* ..... Meadville, Pa.
W'n Div.: T. A. Phillips, *Supt* ..... Galion, O.
Wm Hill, *M. M.* ..... Galion, O.
J. W. Holmes, *For. Car Rep* ..... Galion, O.
Geo. Wilson, *For. Car Rep* ..... Dayton, Ohio.
Mahoning Div.: J. Ramsey, *Supt.* ..... Cleveland, O.
N. Wright, *M. M.* ..... Cleveland, O.
Chas. Wilson, *M. C. Rep* ..... Cleveland, O.
New York, New Haven & Hart

Goodell & Waters

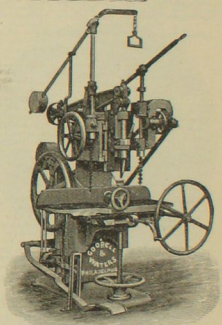
PHILADELPHIA, PA.



KEYSTONE FLOORING MACHINE.

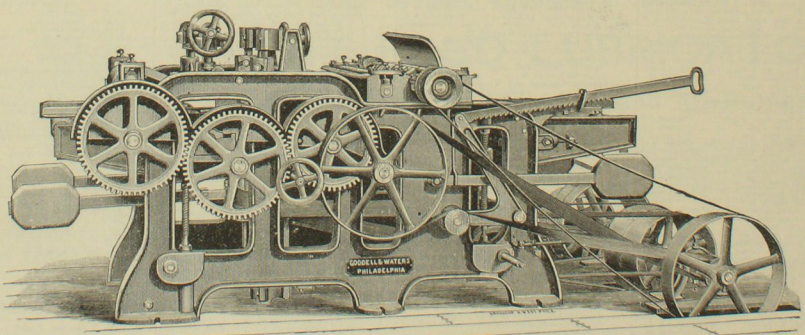


LARGE TRAVERSE CUT-OFF SAW.



HEAVY CAR MORTISER.

FOR PLANING MILLS, CAR SHOPS, BRIDGE BUILDERS, Etc., Etc.



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CAR SILL PLANER AND DOUBLE-SURFACER AND JOINTER.

GOODELL & WATERS,

31st and Chestnut Streets, - - - - PHILADELPHIA, PA.

E. B. Burnham, *Pur. Agt.*...Ogden-burg, N. Y.
Abr. Klohs, *Supt. & M. M.*...Malone, N. Y.
J. N. Brown, *Master Builder.*Ogdensburg, N. Y.
Ohio Central R. R. 4-8½ g. 335 m. 40 lo. 4,700 cars.
John E. Martin, *Sec.*...Toledo, O.
T. M. Peelar, *Supt.*...Bucyrus, O
T. W. Stewart, *Pur. Agt.*...Toledo, O.
J. R. Morgan, *M. M. & C. B.*...Bucyrus, O.
Ohio River R. R. 4-9 g. (in progress)
Chas. Howard, *Gen. Supt.*Parkersburg, W. Va.
Ohio Southern R. R. *(See Ind., Bloom. & W.Va.)*
Ohio & Mississippi Ry. 4-8½ g. 201 m. 2,501 cars.
W. W. Peabody, *Pres. & Gen. Man.*Cincinnati. O.
G. E. Atwood, *Pur. Agt.*...Cincinnati, O.
J. H. Setchel, *Gen. M. M.*...Cincinnati. O.
Cin. Div.; C. B. Cole, *Supt.*...Seymour, Ind.
F. E. Janes, *Gen. Mor.*...Seymour, Ind.
J. P. Coulter, *M. C. B.*...Aurora, Ind.
Arthur Donaldson *M. M.*...Vincennes, Ind
M. M....Boston, Mass.
Jas. H. Lauder, *Supt. B. S.*...Boston, Mass.
Sam. Stevens, *S. Br. & Bld'gs.*...Boston, Mass.
Main Li. Div.; J. H. French, *Supt.*...Boston, Mass.
M. M....Boston, Mass.
Cape Cod Div.; C. H. Nye, *Supt.*...Hyannis, Mass.
C. Berkley Powell, *M. M.*...Hyannis, Mass.
No. Div.; S. A. Webber, *Supt.*...Fitchburg, Mass.
F. B. Twombly, *M. M.*...Fitchburg, Mass.
Olympia & Chehalis Val. R. R.
3 g. 15 m.
Otis Sprague, *Supt.*...Olympia, W. T.
Oregon Ry. & Navigation Co.
5 g. 4-8½ g. 377 m. 72 lo. 1,611 cars.
C. H. Prescott, *P. & Gen. Man.*...Portland, Ore.
F. T. Dodge, *Supt.* (Riv. Div.)...Portland, Ore.
H. S. Rowe, *Supt.* (Ry Div.).....Portland, Ore.
J. M. Drake, *Pur. Agt.*...Portland, Ore.
Goodall, Perkins & Co., *Supt.* (Ocean Div.)
Transcontinental Co.
C. C. Hobart, *Gen. M. M.*...The Dalles, Ore
Chas. A. Phipps, *M. C. B.*...The Dalles, Ore.
Oregon & California R. R. 4-8½ g. 440 m. 43 lo. 626 c
R. Koehler, *Gen. Man.*...Portland, Ore
J. Brandt, *Gen. Supt.*...Portland, Ore
W. T. Bodley, *Pur. Agt.*...Portland, Ore.
A. Brandt, *M. M.*...Portland, Ore.
Ottumwa & Kirkville Ry. 4-8½ g. 13 m.
J. A. Kebler, *Supt.*...Ottumwa, Ia.
Owensboro & Nashville R. R. 3 g. 4 m. 30 lo. 200 c.
M. Newbold, *Supt.*...Owensboro, Ky.
H. M. Gabel, *M. M. & C. B.*...Owensboro, Ky.
Oxford & Henderson R. R. 4-8½ g. 13 m. 2 lo. 11 c.
James A. White, *Gen. Supt.*...Henderson, N. C.
James E. Lawrence, *M. M.*...Henderson, N. C.

P

Pacific Coast Ry. 3 g. 64 m.
J. M. Fillmore, *Manager* San Luis Obispo, Cal.
W. H. Masterman, *M. M. & C. B.* do.
Painesville & Youngstown Ry. 3 g. 35 m. 7 lo. 319 c.
R. K. Paige, *Gen. Man.*...Painesville, O.
J. A. Newcome, *Supt. R. S.*...Painesville, O.
Panama R. R. 5 g. 48 m. 15 lo. 1,000 cars.
G. A. Burt, *Gen. Supt.*...Aspinwall, U. S. Col.
E. Z. Penfield, *Pur. Agt.*...Aspinwall, U. S. Col.
Jas. Reilly, *M. M.*...Aspinwall, U. S. Col.
Passumpsic R. R. 4-8½ g. 147 m. 28 lo. 1,101 cars.
E. Raymond, *Pres. & Pur. Agt.*Barnet, Vt.
H. E. Folsom, *Supt.*...Lyndonville, Vt.
L. L. Brigham, *M. M.*...Lyndonville, Vt.
C. F. Woodard, *M. C. B.*...Lyndonville, Vt.
Paulding & Cecil Railway. 4-8½ g. 7 m. 3 lo. 28 c.
S. Frank Eagle, *Pres.*...Cecil, O.
Paw Paw and Toledo & South Haven R. Rds.
3 g. 29 m. 3 lo. 16 cars.
John Ilsley, *Supt.*...Lawton, Mich.
Peach Bottom R. R. 3 g. 55 m. 6 lo. 52 cars.
B. B. Newton, *Supt. & Pur. Agt.*...Oxford, Pa.
E. H. Williams, *M. C. B.*...York, Pa.
W. P. Kirk, *M. M.*...Oxford, Pa.
Pemigewasset Valley R. R. 4-8½ g. 21 m. 2 lo. 127c.
J. Thomas Vose, *Pres.*...Boston, Mass.
Pennsylvania Co.'s (O.) Roads.
4-9 g. 2,222 m. 920 lo. 32,800 cars.
Gen. Divs. (1), (3), (4) and (5).
Wm. A. Baldwin, *Gen. Man.*...Pittsburg, Pa.
John Thomas, *Gen. Supt.*...Pittsburg, Pa.
Thos. Mullins, *Gen. Pur. Agt.*...Pittsburg, Pa.
Joseph Wood, *Supt. M. P.*...Fort Wayne, Ind.
(1) Pittsburg, Ft. Wayne & Chicago R. R.
4-9 g. 468 m. 288 lo. 8,023 cars.
E'n Div.; A. B. Starr, *Supt.*...Allegheny, Pa.
Geo. J. Parkin, *M. M.*...Allegheny, Pa.
D. M. Peppard, *M. M.*...Crestline, O.
W'n Div.; C. D. Law, *Supt.*...Ft. Wayne, Ind.
F. D. Casanave, *M. M.*...Ft. Wayne, Ind.
A. H. Somers, *Gen. Pur. Agt.*...Chicago, Ill.
(2) Ashtabula & Pittsburg.
(3) Erie & Pittsburg R. Rds. 221 m. 29 lo. 1,302 c.
John M. Kimball, *Supt.*...Girard Junc., Pa.
Jos. Wood, *Gen. Pur. Shops*.....Erie, Pa.
(4) Cleveland & Pittsb'g R. R. 225 m. 30 lo. 3,534 c.
R. F. Smith, *Asst. Gen. Supt.*...Cleveland, O.
Philip Bruner, *Supt.*...Wellsville, O
W. F. Beardsley, *Master of Mach.* Wellsville, O.
5) Nc-W'n Ohio Ry.; J. S. Morris, *Supt.*...Toledo, O.
Pennsylvania R. R. Co.'s Roads. (7 Gen. Divs.)
4-9 g. 3,158 m. 1,400 lo. 47,000 cars.
Chas. E. Puch, *Gen. Man.*...Philadelphia, Pa.
Enoch Lewis, *Asst. Gen. Man.*...Philadelphia, Pa.
John Reilly, *Supt. Trans.*...Philadelphia, Pa.
T. N. Ely, *Gen. S. M. P.*...Altoona, Pa.
Pennsylvania R. R. Divs.
4-9 g. 1,213 m. 705 lo. 40,810 cars.
S. M. Prevost, *Gen Supt.*...Altoona, Pa
Frank L. Sheppard, *Supt. M. P.*..Altoona, Pa.
G. W. Stratton, *M. M.*...Altoona, Pa.
Jos. F. Levan, *Gen. Pur.*...Altoona, Pa.
Phila. Div.; Thos. Gucker, *Supt.*Philadelphia, Pa.
H. D. Garrett, *M. M.*...W. Philadelphia, Pa.
I. W. Van Houten, *Gen. For.*...W. Phila., Pa.
Mid. Div.; O. E. McClellan, *Supt.*Harrisburg, Pa.
E. L. Caum, *M. M.*...Harrisburg, Pa.
Samuel W. Myers, *Gen. For.*Harrisburg, Pa.
Altoona Div.; Jas. Reed, *Supt.*...Altoona, Pa.
Pitts. Div.; Robert Pitcairn, *Supt.*...Pittsburg, Pa.
D. O. Shaver, *M. M.*...Pittsburg, Pa.
Jas. Stewart, *Gen. For.*...Pittsburg, Pa.
W. Pa. Div.; A. P. Kirtland, *Supt.*Blairsville, Pa.
W. B. Norris, *M. M.*...Blairsville, Pa.
M. H. Fails, *Gen. For.*...Blairsville, Pa.
Fred. Div.; J. B. Hutchinson, *Supt.*...York, Pa.
Tyrone Div.; S. S. Hiltz, *Supt.*...Tyrone, Pa.
Lew. Div.; Wm. M. Phillips, *Supt.*Lewistown, Pa.
Bed. Div.; R. Hollidge, *Supt.*...Bedford, Pa.
Monong. Div.; David M. Watt, *Supt.*Pittsburg, Pa.
Wm. Lininger, *M. M.*...Pittsburg, Pa.
Schuylkill Div.:
W. N. Bannard, *Supt.*...Philadelphia, Pa.
(2) Cmbrld. R. Rs. of N. J. 5 g. 471 m. 200 lo. 8,000 c.
F. Wolcott Jackson, *Gen. St.*...Jersey City, N. J.
H. S. Hayward, *Supt. M. P.*...Jersey City, N. J.
David H. Baker, *Gen. For.*...Jersey City, N. J.
N.Y.Div.; Robt. E. Pettit, *Supt.*Jersey City, N. J.
L. A. Boodever, *M. M.*...Jersey City, N. J.
E. F. Boodever, *Gen. For.*...Jersey City, N. J.
Belv. Div.; A. Anderson, *Supt.*Lambertv., N. J.
D. McDowell, *M. M.*...Lambertville, N. J.
Amboy Div.; I. S. Buckalew, *Supt.*Camden, N. J.
Thos. Kerr, *M. M.*...So. Amboy, N. J.
P. S. Bozart, *Gen. For.*...So. Amboy N. J.
Camden & At. Div.; 75 m. 18 lo. 90 c.
Joseph Crawford, *Supt.*...and
Rufus Hill, *M. M.*...Camden, N. J.
Samuel Wills, *C. B.*...Camden, N. J.
(3) West Jersey R. R. 4-9 g. 188 m. 27 lo. 294 cars.
Joseph Crawford, *Gen. Supt.*...Camden, N. J
W. McAlister, *M. M.*...Camden, N.J.
C. C. Williams, *Gen. For.*...Camden, N. J.
(4) Phila., Wilm. & Balt. R.R. 409 m. 158 lo. 1,882 c.
F. H. Kenney, *Gen. Supt.*...Philadelphia, Pa.
J. M. Wallis, *S. M. P.*...Philadelphia, Pa.
H. D. Gordon, *M. M.*...Wilmington, Del.
W. B. Langren, *M. C. B.*...Wilmington, Del.
Cen. Div.; L. K. Lodge, *Supt.*.....Media, Pa.
Del. Div.; I. N. Mills, *Supt.*...Wilmington, Del.
Md. Div.; H. R. Carter, *Supt.*...Wilmington, Del.
(5) Phila. & Erie R. R. Divs.; 437 m. 110 lo. 3,089 c.
R. Neilson, *Gen. Supt.*...Williamsport, Pa.
A. O. Dayton, *Supt. Mo Po.*..Williamsport, Pa.
E'n. Div.; E. H. Westfall, *Supt.*Williamsport, Pa.
Sun. H. & W. Div.; *Water, Supt.*; and
H. K. Stout, *M. M.*...Sunbury, Pa.
Mid. Div.; Thos. A. Roberts, *Supt.*...Renovo, Pa.
Wm. L. Holman, *M. M.*...Renovo, Pa.
West'n Div.; W. Reynolds, *Supt.*...Erie, Pa.
W. T. Smith, *M. M.*...Erie, Pa.
(6) Northern Central Ry. 4-9 g. 346 m. 152 lo. 6,610 c.
Robert Nelson, *Gen. Supt.*...Northumberland, Pa.
A. O. Dayton, *Supt. M. P.*...Williamsport, Pa.
A. W. Sumner, *Pur. Agt.*...Baltimore, Md.
J. M. Cable, *M. M.*...Baltimore, Md.
G. W. Demarest, *Gen. For.*...Baltimore, Md.
Susq. Div.; E. H. Westfall, *Supt.*Williamsport, Pa.
Sham. Div.; A. Waiter, *Supt.*...Sunbury, Pa.
Elm. & Corn. Div.; S. Meade, *Supt.*...Elmira, N. Y.
Jas. Strode, *M. M.*...Elmira, N. Y.
J. C. Dyots, *Gen. For.*...Elmira, N. Y.
Baltimore Div.; T. H. Kapp, *Supt.*Baltimore,Md.
(7) Balt. & Pot. & Alex. & Fred. 125 m. 30 lo. 300 c.
H. F. Kemp, *Gen. Supt.*...Philadelphia, Pa.
A. W. Sumner, *Pur. Agt.*...Baltimore, Md.
J. M. Wallis, *Supt. Mo. Po.*...Philadelphia, Pa.
H. D. Gorton, *M. M.*...Wilmington, Del.
J. Lescallett, *For. Mach. Shop*.Washington,D.C.
Wm. Smith, *M. M. Pur Car Shop*.Washington, D.C.
Penn. Coal Co.'s R. R. 4-3 g. 67 m. 23 eng. 3,371 c.
J. B. Smith, *Gen. Supt.*...Dunmore, Pa.
And. Crane, *M. M.*...Dunmore, Pa.
Geo. W. Simpson, *M. C. B.*...Dunmore, Pa.
Pensylvania, Slatington & Wy'e England R. R.
In progress. 4-8½ g. 18 m. 1 lo. 20 cars.
C. H. Stanton, *Supt.*...New York, N. Y.
Pennsylvania & Erie R. R.—Erie Branch.
C. R. Early, *Gen. Supt.*...Ridgeway, Pa.
Pensacola & Atlantic R. R. 4-8½ g. 161 m. 6 lo. 67 cars.
W. D. Chipley, *Gen. Supt.*...Pensacola, Fla.
W. D. Rob's, *M. M.*...Pensacola, Fla.
Pensacola & Perdido R. R. 3 g. 10 m. 5 lo. 93 cars.
B. F. Simmons, *Pr. & Supt.*...Pensacola, Fla.
H. W. Simmons, *Pur. Agt.*...Pensacola, Fla.
J. C. Schutte, *M. M.*...Pensacola, Fla.
People's Ry. 4-8½ g. 15 m. 2 lo. 14 cars.
W. D. Pollard, *Supt.*...Pottsville, Pa.
Peoria, Decatur & Evansville Ry.
W. 4-8½ g. 354 m. 1,660 cars.
G. L. Bradbury, *Gen. Man.*...Peoria, Ill.
P. Reilly, *M. M.*...Mattoon, Ill.
(See Cen. Ia.)
Peoria & Pekin Union Ry. 4-8½ g. 20 m. 12 lo. 106 c.
Thos. B. Burnett, *Gen. Supt. & P. A.*Peoria, Ill.
O. W. Bell, *Supt.*...Peoria, Ill.
R. F. Hurd, *M. M. & C. B.*...Peoria, Ill.
Perkiomen R. R. 4-8½ gauge 39 miles.
D. B. Clack, *Supt.*...Perkiomen Junction, Pa.
H. D. Pyle, *Pur. Agt.*...Norristown, Pa.
Petersburg R. R. 4-8½ g. 64 m. 10 lo. 133 cars.
R. M. Sully, *Gen. Supt.*...Petersburg, Va.
Geo. F. Jones, *Pur. Agt.*...Petersburg, Va.
J. R. Woodard, *M. M.*...Petersburg, Va.
J. W. Fleming, *M. C. B.*...Petersburg, Va.
Philadelphia & Reading R. R. (and Branches.)
(See Penna. R. R.)
Peterborough & Hillsborough, *(See Northern R. R.)*
Philadelphia, Newtown & N. Y. R. R. 4-8½ g. 23 m.
W. M. Geary, *Supt.*...Philadelphia, Pa.
Phila. & Atlantic R. R. 3-4 g. 55 m. 11 lo. 150 cars.
L. B. Paxson, *Eng. of Mach.*...Reading, Pa.
No. Pa. & Bound Brook Div.
I. A. Sweigard, *Supt.*...Philadelphia, Pa.
Mahanoy & Shamokin and other Brs.
J. H. Cohausen, *Supt.*...Pottsville, Pa.
D. C. Reinhart, *Asst. Supt.*...Catawissa, Pa.
A. J. Hesser, *Supt* Mahanoy Plane, Pa.
Schuylkill & Susquehanna Br.:
H. H. Tracy, *Supt.*...Pine Grove, Pa.
Reading & Columbia R.R.:
A. M. Wilson, *Supt.*...Columbia, Pa.
(2) N. J. Central Div.
W. W. Stearns, *Supt.*...Elizabeth, N. J.
W. Woodcock, *M. M.*...Elizabethport, N. J.
Geo. Hackett, *M. C. B.*...Elizabethport, N. J.
C. G. Williams, *M. M.*...Jersey City, N. J.
John Alpaugh, *M. M.*...Jersey City, N. J.
J. Br. Div.; R. Blodgett, *Supt.*...Long Branch, N.J.
N. J. So. Div.; W. W. Stearns, *Supt.* Elizabeth, N. J.
Wm. Montgomery, *M. M.*...Manchester, N. J.
Chas. N. Sawyer, *M. C. B.*...Manchester, N. J.
Lehigh & Susquehanna Div.
Jos. Swoyer, *Supt.*...Mauch Chunk, Pa.
Pittsburgh, Bradford & Buffalo Ry. *(See Pitts. & West.)*
Pittsburgh, Chartiers & Youghiogheny R. R.
4-8½ g. 19 m.
Geo. S. Criswell, *Supt.*...Pittsburgh, Pa.
Pittsburgh, Cincinnati & St. Louis Ry. (5 Gen. Divs.)
4-9 g. 916 m. 230 lo. 7,133 cars.
James Wood, *Manager*.....Columbus, O.
Wm. Mullins, *Pur. Agt.*...Pittsburgh, Pa.
Edward R. Wall, *Supt. M. P.*...Columbus, O.
(1) P.C. & St. L. Div.; E. B. Taylor, *Supt.* Pittsburgh, Pa.
C. B. Street, *M. M.*...Dennison, O.
J. M. Copeland, *C. & P. Car Shops*.Steubenville, O.
2) C. & M. V. Div.; W. F. Black *Supt.*...Zanesville, O.
Leroy Kells, *M. M.*...Zanesville, O.
Wm. Reikle, *Gen. For.*...Lancaster, O.
Daniel Jewell, *Gen. P. Car Shops*.Lancaster, O.
(3) Lt. Mi. Div.; Sidney Dillon, *Supt.*...Cincinnati, O.
Leroy Kells, *M. M.*...Cincinnati, O.
Jos. Underwood, *G. F. Car Shops*.Cincinnati, O.
(4) J. M. & I. R. R.; E. W. McKenna, *Supt.* Louisville, Ky.
Wm. Swanston, *M. M.*...Jeffersonville, Ind.
s.w. Austin, *G. F. M. Shops*.Jeffersonville, Ind.
(5) Indianapolis & Vincennes R. R.
Turner, *Supt.*...Indianapolis, Ind.
Pittsburgh, Cleveland & Toledo R. R.
4-8½ g. 78 m. 18 lo. 525 cars.
C. H. Andrews, *Pres.*...Youngstown, O.
W. F. Hofecker, *M. M.*...Youngstown, O.
Pittsburgh, Ft. Wayne & Chicago Ry see Pa. Co's (1)
Pittsburgh Southern Ry. *(See Balt. & O. S. W.)*
Pitts. & Castle Shannon R. R. 3-4 g. 9 m. 5 lo. 42 cars.
James M. Bailey, *Gen. Supt.*...Castle Shannon, Pa.
Holmes Ward, *M. M.*...Castle Shannon, Pa.
Wm. M. Long, *C. B.*...Washington, D.C.
Pitts. & Lake Erie R. R. 4-8½ g. 70 m. 31 lo. 1,820 c.
W. C. Quincy, *Gen. Man.*...Pittsburgh, Pa.
D. H. Rose, *Gen. Pur. Agt.*...Pittsburgh, Pa.
R. W. Jones, *Mast. Trans.*...Pittsburgh, Pa.
S. W. Haines, *M. M.*...Pittsburgh, Pa.
Pittsburgh, McKeesport & Youghiogheny.
4-8½ g. 37 m. 19 lo. 207 cars.
W. C. Quincy, *Gen. Man.*...Pittsburgh, Pa.
R. W. Jones, *M. of Trans.*...Pittsburgh, Pa.
S. W. Haines, *M. M.*...Pittsburgh, Pa.
Pitts. & Western R. R. 3 & 4-8½ g. 110 m. 18 lo. 905 c.
Pitts., Bradford & Buff. Ry. 3 g. 90 m. 8 lo. 110 c.
Thos. M. King, *Gen. Man.*...Allegheny, Pa.
J. T. Johnson, *Supt.*...Allegheny, Pa.
H. Morton Hall, *Pur. Agt.*...Allegheny, Pa.
W. M. Flahavhan, *M. M.*...Allegheny, Pa.
Pontiac, Oxford & Pt. Austin R. R. 109 m.
Geo. W. Debevoise, *Pr. & Gen. Man.*Oxford, Mich.
Jas. Houston, *Gen. Supt.*...Oxford, Mich.
Port Huron So. Western Ry. 4-8½ g. 18 m. 14 lo. 288 c.
H. McMorran, *G. Man. & P. A.*Port Huron, Mich.
J. R. Wadsworth, *Supt.*...Port Huron, Mich.
Chas. Desfondelin, *M. M.*...Port Huron, Mich.
Benj. Hiller, *M. C. B.*...Port Huron, Mich.
Port Jervis & Monticello R. R. 4-8½ g. 24 m. 3 lo. 19 c.
M. V. Heller, *Gen. Man.*...Port Jervis, N. Y.
Port Royal & Augusta Ry. 3 g. 180 m. 16 lo. 311 c.
J. N. Bass, *Supt.*...Augusta, Ga.
T. F. Warwick, *M. M. & M. C. B.*Augusta, Ga.
Portland & Ogdensburg. 4-8½ g. 110 m. 13 lo. 231 c.
J. Hamilton, *Gen. Supt. & P. A.*Portland, Me.
M. M....Portland, Me.
W. G. Brewer, *M. C. B.*...Portland, Me.
Portland & Rochester R. R. 4-8½ g. 52 m. 7 lo. 230 c.
J. W. Peters, *Supt. & Pur. Agt.*...Portland, Me.
E. H. C. Tompson, *For. of Mach.*Portland, Me.
David Tate, *For. of Repairs*.Portland, Me.
Potomac. Fred'g & Pied. R. R. 3 g. 38 m. 2 lo. 58 c.
Will M. Grafton, *Supt.*...Fredericksburg, Va.
Jno. Coleman, *M. M.*...Fredericksburg, Va.
Pough., Hart. & Dos. R. R. 4-8½ g. 45 m. 4 lo. 65 c.
J. A. Perkins, *Supt.*...Poughkeepsie, N. Y.
John L. Donaldson, *M. M.*Poughkeepsie, N. Y.
Pratt Coal & Coke Company's R. R. 5 g. 9 m. 2 lo. 100 c.
N. Gelo, *Gen. Supt.*...Pratt Mines, Ala.
Prescott & Thirty-Fifth Parallel R. R.
4-8½ g. 77 miles in progress.
Samuel A. Henszey, *Gen. Man.*...Prescott, Ariz.
Prince Edward Island Ry. 3-4 g. 100 m. 18 lo. 280 c.
Jas. Coleman, *Supt. & Pur. Agt.*;
Jos. Unsworth, *M. Supt. & Storekeeper*; and
D. M. Fraser, *M. C. B.*...Summerside, P. E. I.
Profile & Francona Notch R. R. 3 g. 15 m. 3 lo. 18 c.
Emmons Raymond, *Pur. Agt.*...Bostom, Mass.
C. H. Greenleaf, *Supt.*...Profile House, N. H.
Prospect Park & Coney Island R. R.
4-8½ g. 5 m. 123 cars.
R. Schermerhorn, *Supt.*...Brooklyn, N. Y.
Martin Painter, *M. M.*...Brooklyn, N. Y.
Prov., Warren & Bristol R. R. 4-8½ g. 19 m. 6 lo. 70 c.
Waterman Stone, *Supt.*...Providence, R. I.
Wm. Smith, *M. M. & C. B.*...Barrington, R. I.
Prov. & Springfield R. R. 4-8½ g. 23 m. 4 lo. 92 c.
Wm. Tingham, *Gen. Man.*...Providence, R. I.
G. T. Richardson, *M. M.*...Providence, R. I.
Prov. & Worcester. 4-8½ g. 66 m. 34 lo. 1,155 c.
J. L. Chamberlain, *Asst.*...Providence, R. I.
A. Griggs, *Supt. L. & C. D.*...Providence, R. I.
Pullman's Palace Car Co. 564 passenger cars.
A. B. Pullman, *2d V. Pr. & G. M.*...Chicago, Ill.
Geo. F. Brown, *Gen. Supt.*...Chicago, Ill.
Wm. A. Angell, *Pur. Agt.*...Chicago, Ill.
S. W. Bretzfield, *Asst. Pur. Agt.* New York, N. Y.
A. Bigg, *Man.* (Chicago Works)...Chicago, Ill.
H. L. Spaulding, *Man.* (Det. Shops). Detroit, Mich.
E. A. Benson, *Supt. Shops*.....St. Louis, Mo.

Quebec Central Ry. 4-8½ g. 147 m. 10 lo. 267 cars.
J. R. Woodward, *Gen. Man.*...Sherbrooke, P. Q.
A. Steele, *Supt.*...Sherbrooke, Que., P. Q.
R. D. Morkill, *Jr., Pur. Agt.* Sherbrooke, P. Q.
Jas. Seiveright, *M. M.*...Sherbrooke, P. Q.
Quebec, Montreal, Ottawa & Occidental Ry.
4-8½ g. 354 m. 36 lo. 993 cars.
L. A. Senecal, *Gen. Supt.*...Quebec, Que.
Quebec & Lake St. John Ry. 4-8½ g. 30 m. 3 lo. 55 c.
J. G. Scott, *Manager*.....Roberval, Que.
Frank Fournier, *Supt.*...St. Raymond, P. Q.
John T. Eames, *M. M.*...St. Raymond, P. Q.
Queen Anne's & Kent and Townsend R. R.
(See Penna.; (4) Div.)

R

Raleigh & Augusta Air-Line: Carolina Central.
Raleigh & Gaston R. Rs. 4-8½ g. 436 m. 50 lo. 994 c.
Raleigh & Gaston, *Supt.*...Raleigh, N. C.
Raleigh Rds. 4-8½ g. 194 m. 22 lo. 565 cars.
Carolina Cen. R. R. 4-8½ g. 242 m. 36 lo. 431 c.
L. C. Jones, *Supt.*...Wilmington, N. C.
Jas. Johnston, *M. of Mach. & M. M.*Wilmington, N. C.
S. E. Ethridge, *M. C. B.*...Laurinburg, N. C.
Rensselaer & Saratoga R. R. *(See Del. & Hud. Co.)*
Rhinebeck & Connecticut. *(See Hart. & Ct. Wn.)*
Richmond, Fredericksburg & Potomac R. R.
4-8½ g. 83 m. 12 lo. 376 cars.
E. T. D. Myers, *Gen. Supt.*...Richmond, Va.
T. L. Courtney, *Asst. Supt.*...Richmond, Va.
H. Kuhn, *M. M.*...Richmond, Va.
W. H. Trainham, *M. C. B.*...Richmond, Va.
Rich. & Allegheny R. R. *(See Rich. & Dan.)*
Richmond & Alleghany R R. 4-9 g. 201 m. 19 lo. 837c.
Decatur Axtell, *M. C. & Gen. Man.*Richmond, Va.
M. Sweeney, *Pur. Agt.*...Richmond, Va.
Geo. D. Harris, *M. M. & C. B.*...Richmond, va
Richmond & Danville R. R. 4-8½ g. 340 m.
1,736 miles 128 loco. 3,833 cars.
A. L. Fletcher, *Supt.*...Richmond, Va.
Peyton Randolph, *As. G. Man.*...Richmond, Va.
J. P. Minetree, *Pur. Agt.*...Richmond, Va.
H. D. Wade, *Mast. Trans.*...Richmond, Va.
Richmond & Petersburg R R.
W. H. Green, *Supt.*...Richmond, Va.
M. M....Richmond, Va.
J. B. Vaughan, *Car Sh.*...Richmond, Va.
North Carolina Div. 5 g. 223 m. 22 lo. 268 cars.
R. A. Miller, *Supt.*...Raleigh, N. C.
W. H. Turrentine, *M. M.* Comp'y's Shops, N. C.
J. C. Holt, *For. Car Sh.* Comp'y's Shop N. C.
A. Jas. *M. M. & C. B.* (R. roads)...Selma, N. C.
Narrow-Gauge Branches. 3 g. 80 m. o. lo. 41 c.
Richmond & Petersburg R. R. 4-8½ g. 25 m. 8 lo. 132 c.
J. R. Kenly, *Supt.*...Richmond, Va.
Wm. Forbes, *M. M.*...Richmond, Va.
3-6 g. 22 m. 3 lo. 40 cars.
Rio Grande R. R.
M. J. Gomila, *Rec. & Gen. Man.*Brownsville, Tex.
G. W. Smith, *M. M.*...Brownsville, Tex.
M. Markwood, *M. C. B.*...Brownsville, Tex.
Rio Grande, Sabine & Red R. 4-8½ g. 25 m. 2 lo. 30 cars.
W. W. Hungerford, *Man.*...Lar'do, Tex.
Rochester & Lake Ontario Ry. 4-8½ g. 6 m. 1 lo. 15 c.
Rochester, *Supt.*...Rochester, N. Y.
Rochester & Pittsb'g R. R. 4-8½ g. 200 m. 60 lo. 3,140 c.
Geo. E. Hamilton, *Gen. Supt.*...Rochester, N. Y.
J. T. Gardiner, *Gen. Supt.*...Buffalo, N. Y.
C. W. Mills, *Supt. M. P.*...Rochester, N. Y.
Rock Island & Country R. R. and
Rock I'd & Peoria Ry. 4-8½ g. 113 m. 13 lo. 357 c.
R. R. Cable, *Pres. & Gen. Supt.*...Rock Island, Ill.
R. J. & P. Ry.; H. B. Sudlow, *Supt. & P. A.*do.
Joseph Elder, *M. M.*...Peoria, Ill.
R. J. & C. Ry.; R. T. Cable, *Supt.* R'k Island, Ill.
J. H. Parks, *M. M.*...Rock Island, Ill.
Rogersville & Jefferson R. R. 3 g. 16 m. 1 lo. 20 c.
C. M. Lusty, *Supt.*...Rogersville, Tenn.
Jno. Lusty, *M. M.*...Rogersville, Tenn.
Rome R. R.
Rome, *Ga.*
Edward Hillyer. *Supt.*...Rome, Ga.
O. W. Harbin, *M. M. & C. B.*...Rome, Ga.
Rome, Watertown & Ogdensburg R. R.
4-8½ g. 417 m. 61 lo. 1,831 cars.
H. M. Britton, *Gen. Man.*...Ogdensburg, N. Y.
Geo. H. Haselton, *S. M. P. & M.*Oswego, N. Y.
E'n Div.; J. D. Remington, *A. Supt.* Watertown, N. Y.
W'n Div.; H. Hayward, *A. Supt.*Oswego, N. Y.
Roodhouse & Scottsville Ry. In progress.
Geo. D. Merrill, *Gen. Man.*...Roodhouse, Ill.
Ruby Hill R. R. *(See Eureka & Pal.)*
Rumford Falls & Buckfield R. R. 4-8½ g. 29 m. 21 cars.
L. L. Lincoln, *Supt. & Pur. Agt.*...Lincoln, Me.

S

Sabine & East Texas Ry. *(See Cen. Pac.)*
Sacramento Valley R. R. *(See Cen. Pac.)*
Saginaw Bay & North'n R. R. 4-8½ g. 31 m. 6 lo. 136 c.
J. Jackson, *Gen. Man.*...Saginaw, Mich.
F. T. Lillie, *Act. Pur. Agt.*...Pinconning, Mich.
Edward Keeler, *M. M.*...Pincconning, Mich.
Saginaw, Tuscola & Huron R. R.
3 g. 50 m. 3 lo. 83 cars.
M. B. Wilkinson, *Gen. Supt.*...Saginaw, Mich.
Saginaw Valley & St. Louis R. R. 4-8½ g. 39 m. 41. 04 c
N. W. Merrill, *Supt.*...Saginaw, Mich.
Allan Bourn, *Pur. Agt.*...Detroit, Mich.
Geo. C. Watrous, *M. M.*...Iona, Mich.
Salisbury R. R. 4-8½ g. 11 m. 1 lo. 1 car.
R. J. Batzer, *Supt.*...Pittsburgh, Pa.
Salt Lake & Western R. R. *(See Un. Pac.; (0) Div.)*
San Francisco & No. Pac. 4-8½ g. 120 m. 11 lo. 245 c.
Arthur Hughes, *Gen. Man.*...San Francisco, Cal.
H. C. Whiting, *Supt.*...San Rafael, Cal.
Ed. Reynolds, *Gen. M. M.*...Donanae, Cal.
Ed. Reynolds, *M. C. B.*...Donahue, Cal.
Sanborn, Cooperstown & Turtle M. R. R. In progress.
C. A. Roberts, *Gen. Man.*...Sanborn, Dak.
Sandy River R. R. 3 g. 18 m. 3 lo. 56 cars.
N. B. Seal, *Pres. & Supt.*...Phillips, Me.
Jno. Higgins, *M. M.*...Phillips, Me.
M. Saunders, *M. & M. C. B.*...Farmington, Me.
Saratoga, Mechanicville & Newark R. R. *(See So. Flor.)*
Sanford & Indian River R. R.
San Luis Obispo & Santa Maria R. R.
3 g. 20 m. 2 lo. 30 cars.
Charles Goodall, *Man.*...San Francisco, Cal.
Sate Ven. R. R. 3 g. 33 m. 2 lo. 57 cars.
F. C. Hand, *Supt.*...Wales, U. T.
J. S. Bandgrey, *Pur. Agt.*...Salt Lake, U. T.
B. Bates, *M. M.*...Wales, U. T.
Santa Cruz R. R. *(See Cen. Pac.; Gen'l Div.)*
Saratoga, Mt. McGregor & Lake George R. R.
3 g. 11 m. 3 lo. 12 cars.
John McGregor, *Supt.*...Saratoga Springs, N. Y.
Savannah, Florida & W'n Ry. 5 g. 425 m. 50 lo. 736 c.
H. S. Haines, *Gen. Man.*...Savannah, Ga.
R. G. Fleming, *Supt.*...Savannah, Ga.
F. S. Pendergast, *Ch. Eng.*...Savannah, Ga.
A. S. Atwell, *M. M.*...Savannah, Ga.
G. M. D. Riley, *M. of Mach.*...Savannah, Ga.
Thomas Hunter, *For. Car Dept.*...Savannah, Ga.
Sav., Griffin & No. Ala. R. R. *Op. by Central (Ga.).*
Schuylkill & Lehigh R. R. *(See Middleburg & Sch.)*
Schuylkill Navigation R. R. *(See Penna. R. R. Sch. Div.)*
Scioto Valley R. R. 4-8½ g. 132 m. 17 lo. 548 cars.
Geo. Skinner, *Supt. & P. A.*...Portsmouth, O.
R. Bromley, *M. M.*...Portsmouth, O.
Seaboard & Roanoke R. R. 4-8½ g. 80 m. 10 lo. 384 c.
E. G. Ohio, *Gen. Man. of Trans.*...Portsmouth, Va.
J. A. Walton, *Pur. Agt.*...Portsmouth, Va.
W. H. Peebles, *M. M.*...Portsmouth, Va.
Sedalia, Warsaw & Southern Ry. *(See So. Pac.)*
Sharpsville R. R. 4-8½ g. 23 m. 3 lo. 15 cars.
Thomas M. King, *Gen. Man.*...Pittsburgh, Pa.
Walter Pierce, *Gen. Man.*...Sharpsville, Pa.
Shell Beach R. R. 3 g. 22 m.
M. R. Spelman, *Supt.*...New Orleans, La.
Shenandoah Valley R. R. 4-9 g. 249 m. 32 lo. 849 c.
T. T. Blair, *G. Man. & Pur. Agt.* Greenville, Pa.
Edw. Richardson, *M. M. & C. B.* Greenville, Pa.
Shepaug R. R. 4-8½ g. 36 m. 3 lo. 56 cars.
Edwin McNeil, *Supt.*...Litchfield, Ct.
J. J. Brodrigg, *M. M.*...Litchfield, Ct.
Ship Is., Ripley & Ky. R. R. 3 g. 25 m. 2 lo. 23 cars.
C. L. Harris, *Supt. & Pur. Agt.*...Ripley, Miss
W. H. Hinch, *M. M.*...Ripley, Miss.
Silver City, Deming & Pacific R. R. 3 g. 47 m. 31. 141 c.
E. M. Sheldon, *Gen. Man.*...Silver City, N. M.
Silver Lake Ry. 4-8½ g. 6 m. 1 lo. 4 cars.
S. L. Chapin, *Supt.*...Perry, N. Y.
Simkos & Hummelstown R. R. 4-8½ g. 28 m. 2 lo. 40 cars.
Geo. S. Skilton, *Supt.*...Altata, Sinaloa, Mex.
John B. Neal, *M. M.*...Hummelstown, Pa.
Skaneateles R. R. 3 g. 5 m. 2 lo. 5 cars.
J. McNam

St. Louis & Cairo Div.: 4-8½ g 137 m. 17 to. 800 c
G. W. Parker, *Gen. Man*.....St. Louis, Mo.
J. L. Hinckley, *Supt*.....Belleville, Ill.
A. M. De Clerq, *M. M*.....St. Louis, Mo.
St. Louis Bridge Co. and Tunnel R. R.
4-8½ g. 31 m. 22 lo. 11 cars.
Wm. Taussig, *Gen. Man*.....St. Louis, Mo
A. W. Dickinson, *Supt*.....St. Louis, Mo.
J. K. Williams, Jr., *Pur. Agt*.....St. Louis, Mo.
H. M. Smith, *M. M*.....St. Louis, Mo.
St. Louis, C. Coeur & St. Cb. Ry.....3 g. 16 m.
F. M. Volmure, *Gen. Man*.....St. Louis, Mo.
St. Louis Coal R. R.....4-8½ g. 93 m. 10 lo. 317 cars.
Jas. Prentice, *Supt*.....Carbondale, Ill.
Jas. A. Bryden, *Pur. Agt*.....St. Louis, Mo.
St. Louis, Des Moines & Northern Ry.....4-8½ g. 43 m.
C. F. Mark, *Supt*.....Des Moines, Ia.
St L., Ft.Scott & Wichita R. R. 4-8½ g. 100 m. 61.337 c.
J. W. Miller, *V. P. & Gen. Man*.....Fort Scott, Kan.
Thos. N. Lewis, *Asst. Supt*.....Fort Scott, Kan.
Tho. N. Lewis, *Pur. Agt*.....Fort Scott, Kan.
Henry Berger, *M. M*.....Ft. Scott, Kan.
A. A. Liddell, *M. C. R*.....Ft. Scott, Kan.
St. L., Hannibal & Keokuk.....4-8½ g. 85 m. 5 lo. 70 c.
W. W. Walker, *Gen. Supt*.....Hannibal, Mo.
Geo. Douglass, *Pur. Agt*.....Hannibal, Mo.
St. Louis, Iron Mt. & So'n Ry. (*See Mo. Pac.*) (4 *Div.*)
St. L., Keokuk & No.-W'n Ry. (*See C. B. & Q.*)
St. L., Salem & Little Rock.....4-9 g. 72 m. 3 lo. 11 c.
H. A. Crawford, *Ft. P. & P. A*.....St. Louis, Mo.
E. B. Sankey, *Supt*.....Steelville, Mo.
Thomas Everson, *M. M*.....Steelville, Mo.
J. W. Houston, *M. C. R*.....Steelville, Mo.
St. Louis & Cairo R. R.....4-8½ g. 132 m. 22 lo. 800 cars.
Hamilton, *Gen. Supt*.....St. Louis, Mo.
T. W. Newell, *M. M*.....E. St. Louis, Mo.
St. L. & San Fran. Ry.....4-8½ g. 202 m. 88 lo. 3,000 c.
C. W. Rogers, *V. P. & Gen. Man*.....St. Louis, Mo.
D. H. Nichols, *Asst. Gen. Man*.....Springfield, Mo.
T. T. Mann, *Jr., Pur. Agt*.....St. Louis, Mo.
M. Kearney, *M. M. & C. B*.....No. Springfield, Mo.
East Div.: A. Veech, *Supt*.....St. Louis, Mo.
Central Div.: W. A. Thomas, *Supt*.....Springfield, Mo.
Kan. Div.: J. R. Wentworth, *Supt*.....Neodesha, Kan.
Southw. & Upham Ry. 4-8½ g. 30 m. 2 lo. 8 cars.
St. Martin's & Upham Ry.....St. Martin's, N. H.
A. E. Killam, *Manager*.....St. Martin's, N. H.
St. Paul Eastern Grand Trunk Ry.....4-8½ g. 15 m.
D. C. Lamb, *Gen. Supt*.....Oconto, Wis.
St. Paul, Minneapolis & Manitoba Ry.
4-8½ g. 1,402 m. 201 lo. 5,068 cars.
A. Manvel, *Gen. Man*.....St. Paul, Minn.
E. B. Wakeman, *Asst. Gen. Supt*.....St. Paul, Minn.
J. C. Morrison, *Pur. Agt*.....St. Paul, Minn.
H. Middleton, *M. M & C. B*.....St. Paul, Minn.
Breck. Div.: W. S. Kemp, *Supt*.....St. Paul, Minn.
F. F. Div.: J. B. Rice, *Supt*.....Crookston, Minn.
No'n Div.: A. Guthrie, *Supt*.....Crookston, Minn.
St. Paul & Duluth R.R. 4-8½ g. 225 m. 37 lo. 1,080 c.
W. H. Fisher, *Gen. Supt*.....St. Paul, Minn.
J. G. Callahan, *Pur. Agt*.....St. Paul, Minn.
Chas. F. Ward, *M. M. & M. C. B*.....St. Paul, Minn.
State Line & Sullivan R. R. 4-8½ g. 25 m. 3 lo. 263 c.
I. O. Blight, *Supt*.....Towanda, Pa.
Staten Island R. R.....4-8½ g. 13 m. 4 lo. 18 c.
W. Wilbur, *Supt*.....New York, N. Y
Stony Clove & Catskill Mountain R. R.
3 g. 14 m. 2 lo. 12 cars.
Geo. Coykendall, *Gen. Supt*.....Rondout, N. Y
Stony Creek R. R.....Norristown, Pa.
Geo. B. Boggs, *Supt*.....4-8½ g. 2 m. 1 lo.
Sterling Mountain Ry.....Sloatsburg, N. Y.
S. C. Missimer, *Supt*.....Sloatsburg, N. Y.
Suffolk Lumber R. R.....3 g. 15 m. 3 lo. 41 cars.
W. M. Whaley, *Supt*.....Suffolk, Va.
Summit Branch R. R.....4-9 g. 20 m. 7 lo. 10 cars.
Thomas Gucker, *Supt*.....Summit, Pa.
Susquehanna & Delaware River R. R. In progress
D. Y. Kilgore, *Pres*.....Philadelphia, Pa.
Sussex R. R.....(*See Del., Lack. & W'est.*)
Syracuse, Binghamton & N. Y. R. R. (*See D. L. & W.*)
Syracuse, Geneva & Corning.....(*See Northern*)
Syr., Ontario & N. Y. R. R.....(*See N. Y., Ont. & W.*)
Syracuse, Geneva & Corning, Cayuga & Antrim R. Rs.
4-8½ g. 142 m. 28 lo. 1,044 c.
A. H. Gordon, *Asst. Supt*.....Corning, N. Y.
W. E. Gorton, *Asst. Supt*.....Corning, N. Y.
Andrew Beers, *Pur. Agt*.....Corning, N. Y.
G. C. Paschell, *M. M*.....Corning, N. Y.
C. J. Butler, *M. C. B*.....Corning, N. Y.

T

Tennessee Coal R. R.....5 g. 28 m. 8 lo. 204 cars.
A. M. Shook, *Gen. Man*.....Tracy City, Tenn.
W. A. Knight, *M. M*.....Tracy City, Tenn.
Tennessee & Coosa Valley R. R.
3 g. 42 m. 1 lo. 24 cars.
Chas. Clinton, *Gen. Supt*.....Spring City, Tenn.
F. Y. Mooney, *Pur. Agt*.....Spring City, Tenn.
Terre naute & Indianapolis R. R.
4-9 g. 208 m. 100 lo. 4,170 cars.
Joseph Hill, *Gen. Supt*.....St. Louis, Mo.
C. R. Peddle, *P. Agt*.....Terre Haute, Ind.
Geo. H. Prescott, *S. M. P. & M*.....Terre Haute, Ind.
F. C. Cleaver, *M. M*.....Terre Haute, Ind.
E. D. Carter, *C. D*.....Terre Haute, Ind.
Chas. Butler, *M. M*.....Effingham, Ill.
Clinton Idler, *Foreman*.....Indianapolis, Ind.
Terre Haute & So.-Eastern Ry 4-9 g. 44 m. 2 lo. 145 c.
Geo. Atherton, *Supt*.....Terre Haute, Ind.
Texas-Mexican Ry.....(*See Mex. Nat.*
Texas Trunk R. R.....4-8½ g. 36 m. 2 lo. 8 cars.
Hugh Irwin, *Gen. Supt*.....Dallas, Tex.
Texas Western Ry.....3 g. 52 m. 2 lo. 44 cars.
Henry Hatch, *Gen. Man*.....Houston, Tex.
T. F. Gilman, *M. M*.....Houston, Tex.
Texas & N. O. R. R. (*See Con. Pac.; G. H. & S. A. Div.*)
Texas & Pacific.....(*See Mo. Pac. Ry. (6 Div.)*
Texas & St. Louis Ry. 3 g. 769 m. 84 lo. 2,000 cars.
W. R. Woodard, *Rec*.....St. Louis, Mo.
J. J. Frey, *Gen. Supt*.....St. Louis, Mo.
C. S. Brooks, *Pur. Agt*.....St. Louis, Mo.
Tex. Div.: J. T. Gerry, *Supt*.....Tyler, Tex.
T. J. Mian, *M. M*.....Tyler, Tex.
C. B. Jones, *M. C. B*.....Pine Bluff, Ark.
Tionesta Valley R. R.....3 g. 15 m.
George Dickinson, *Gen. Supt*.....Sheffield, Pa.
Tioga R. R.....4-8½ g. and 6 g. 67 m. 18 lo. 500 cars.
R. Dupuy, *Supt*.....Blossburg, Pa.
J. C. Guthrie, *Pur. Agt*.....Blossburg, Pa.
Pero Bonny, *M. M*.....Blossburg, Pa.
D. H. Stratton, *M. C. B*.....Blossburg, Pa.
Toledo, Ann Ar. & No. 31 R. Ry.
4-8½ g. 63 m. 2 lo. 186 c.
J. M. Ashley, *Gen. Man*.....Ann Arbor, Mich.
H. W. Ashley, *Supt. & Pur. Agt*.....do
C. C. Dodge, *M. M*.....Ann Arbor, Mich.
Toledo, Cin. & St. Louis R.R. 3 g. 798 m. 101 lo. 3,500 c.
E. P. Murray, *Gen. Supt*.....Toledo, O.
F. W. Stewart, *Pur. Agt*.....Toledo, O.
L.W. James, *Supt. Mach*.....Delphos, O.
Toledo Div.: W. H. Vandergrift, *Supt*.....do
Thos. Robertson, *M. M*.....Delphos, O.
J. S. Wiers, *For. Car Rep*.....Delphos, O.
Del. & Cin. Divs.: C. A. Bell, *Supt*.....Cincinnati, O.
T. J. Hamer, *M. M*.....Cincinnati, O.
So.-Ea. Div. and Dayton Div.:
C. E. Henderson, *Gen. Man*.....Dayton, O.
W. H. Anderson, *M. M*.....Dayton, O.
St. Louis Div.: Frank F. Allen.....Charleston, Ill.
F. H. Murphy, *M. M*.....Charleston, Ill.
Ironton Div.: U. C. Clare, *Supt*.....Ironton, O.
Dayton Div.: J. E. Appleton, *Supt*.....Dayton, O.
Toledo & Indianapolis R. R. 4-8½ g. 43 m. 4 lo. 118 c.
M. Clark, *Supt*.....Toledo, O.
H. M. Swan, *M. M*.....Toledo, O.
Toledo & South Haven R. R.....(*See Brad., H. & K.*)
Tonawanda Val. & Cuba R. R.....(*See Pur. Pur.*)
Toronto, Grey & Bruce Ry. 4-8½ g. 191 m. 28 l. 440 c.
Edmund Wragge, *Gen. Man*.....Toronto, Can.
W. Watson, *Pur. Agt*.....Toronto, Can.
David Preston, *M. M*.....Toronto, Can.
Toronto & Nipissing Ry.....(*See Mid. Ry. of Can.*)
Troy & Boston R. R.....4-8½ g. 48 m. 20 lo. 484 cars.
O. Robinson, *Pres. & Pur. Agt*.....Troy, N. Y.
oseph Crandell, *Supt*.....Troy, N. Y.
Z. B. Davis, *M. M*.....Troy, N. Y.
A. Brower, *M. C. R*.....Troy, N. Y.
Troy & Greenfield R. R. & H. Tunnel. 4-8½ g. 44 m.
J. W. Locke, *Man*.....North Adams, Mass.

Tuckerton R. R.....4-9 g. 31 m. 2 lo. 29 cars.
J. J. Pharo, *Supt. & Pur. Agt*.....Tuckerton, N. J.
U
Ulster & Delaware R. R. 4-8½ g. 74 m. 10 lo. 314 cars.
Jas. R. Jones, *Supt*.....Rondout, N. Y.
Joseph Rush, *M. M*.....Rondout, N. Y.
John H. Decker, *M. C. B*.....Rondout, N. Y.
Union Pacific Ry. (7 Gen. Divs.).....
3 & 4-8½ g. 4,063 m. 310 lo. 10,550 cars.
S. R. Callaway, *Gen. Man*.....Omaha, Neb.
S. T. Smith, *M. M*.....Omaha, Neb.
Thos. L. Kimball, *Asst. Gen. Man*.....Omaha, Neb.
M. H. Goble, *Pur. Agt*.....Omaha, Neb.
I. H. Congdon, *S. M. P. & C. D*.....Omaha, Neb.
John Wilson, *Asst. do*.....Omaha, Neb.
(1) Neb. Div.: G. H. Dorrance, *Gen. Supt*.....Omaha, Neb.
E. Div.: C. B. Havens, *Supt*.....Omaha, Neb.
R. McConnell, *M. M*.....Omaha, Neb.
A. M. Collett, *M. C. B*.....Omaha, Neb.
E. Slepgy, *M. M*.....O. Island, Neb.
L. Pole Div.: W. F. Deuel, *Supt*.....Channe, W. T
J. H. McConnell, *M. M*.....N. Platte, Neb.
R. McDougall, *M. M*.....Cheyenne, W. T.
(2) Wy. Div.: E. Dickenson, *Gen. Supt*.....Laramie, W. T.
T. E. Lewis, *M. M*.....Laramie, W. T.
T. A. Davis, *M. M*.....Rawlins, W. T.
Wes. Div.: C. E. Wurtelle, *Supt*.....Evanston, W. T.
Geo. F. Chapman, *M. M*.....Evanston, W. T.
Gen. Supt.....Ogden, U
(3) Idaho Div.:.....Pocatello, Id.
F. Rearden, *M. M*.....Pocatello, Id.
Ogden Short Line Div.:.....
R. Buckenserfter, *Supt*.....Pocatello, Id.
Utah & Northern Div.:.....Eagle Rock, Id.
W. P. Hall, *Clair, Supt*.....Eagle Rock, Id.
W. J. Hemphill, *M. M*.....Eagle Rock, Id.
W. J. Hemphill, *M. M*.....Eagle Rock, Id.
J. W. Paul, *Gen. For. C. D*.....Eagle Rock, Id.
(4) Col. Cent. Div.: A. E. Perkins, *Gen. Supt*.....Denver, Col.
F. Meirtsheimer, *M. M*.....Denver, Col.
C. C. Div.: P. Touhy, *Supt*.....Denver, Col.
So. Park Div.: H. S. Severy, *A. Supt*.....Como, Col.
(5) Kan. Div.: H. O. Brinkerhoff, *G. Supt*.....Kan. City, Mo.
K. Pac. Div.: J. F. Goodhart, *Supt*.....Kan. City, Mo.
J. O. Chapman, *M. M*.....Armstrong, Kan.
T. B. Roberts, *M. C. B*.....Armstrong, Kan.
Kansas Central Div.:.....
J. O. Brinkerhoff, *Supt*.....Leavenworth, Kan.
Smoky Hill Div.:.....
O. H. Dorance, *Supt*.....Wallace, Kan.
J. B. Dailey, *M. M*.....Ellis, Kan.
6. Salt Lake & Western Div.:.....Salt Lake City, Utah.
W. W. Ritter, *Supt*.....Salt Lake City, Utah.
7) Nevada Central Ry.....93 m. 4 lo. 78 cars.
J. W. Dunn, *Gen. Supt. & P. A*.....Battle Mt., Nev.
Z. T. Sprigg, *M. M*.....Battle Mountain, Nev.
United States Rolling Stock Co.....10 lo. 4,092 cars.
A. Hegewisch, *Pres*.....New York, N. Y.
H. H. Chadwick, *Gen. Agt*.....Chicago, Ill.
(*See Central of Ga.*)
Upson County R. R.....4-8½ g. 28m. 1 lo. 1 car.
Utah Central Ry.....4-8½ g. 290 m. 22 lo. 452 c.
John Sharp, *Gen. Supt*.....Salt Lake City, Utah.
S. H. Hill, *Pur. Agt*.....Salt Lake City, Utah.
Geo. G. Bywater, *M. M*.....Salt Lake City, Utah.
Peter Reid, *M. C. B*.....Salt Lake City, Utah.
Utah & Nevada Ry.....3 g. 37 m. 3 lo. 3 cars.
W. W. Ritter, *Gen. Man*.....Salt Lake City, Utah.
Robert Anderson, *M. M*.....Salt Lake City, Utah.
Utah & Northern Ry.....(*See Union Pac. Sys.*)
Utah & Pleasant Valley Ry.....4-8½ g. 11 m.
Utica & Elmira Ry. 4-8½ g. 120 m. 5 lo. 250 c.
Geo. S. Austin.....Elmira, N. Y.
Edw. Mahler, *Pur. Agt*.....Elmira, N. Y.
C. J. Howe, *M. M. & C. B*.....Elmira, N. Y.
Utica, & Black Riv. R. R. 4-8½ g. 180 m. 22 lo. 452 c.
J. F. Maynard, *Gen. Supt. & P. A*.....Utica, N. Y.
John Bailey, *M. M*.....Utica, N. Y.
David Jaines, *M. C. B*.....Utica, N. Y.

V

Vaca Vall. & Clear Lake R. R. 4-8½ g. 30 m. 2 lo. 19 c.
R. Stevenson, *Gen. Supt*.....Vacaville, Cal.
Valley Ry. (Ohio).....Cleveland, O.
Isaac Reynolds, *Gen. Man*.....Cleveland, O.
J. E. Turk, *Supt*.....Cleveland, O.
H. Melcher, *Pur. Agt*.....Cleveland, O.
Valley R. R. Va.....4 8½ g. 62 m.
S. Spencer, *Pres*.....Baltimore, Md.
Vermont Val. R. R.....(*See Conn. River.*)
Vicksburg & Brunswick R. R.....(*See Cen. of Ga.*)
Vicksburg & Meridian R. R. (*See Cin., N. O. & Tex. Pac.*)
Vicksburg & Shreveport & Pac. R. R. (*See C., N. O. & T. P.*)
Victoria Ry.....(*See Midland Ry. of Can.*)
Virginia Midland Ry.....(*See St. Louis Div.*)
Virginia & Truckee R. R.....4-8½ g. 54 m. 17 lo. 373 c.
Carson & Colorado R. R.....2 g. 244 m. 6 lo. 50 c.
H. M. Yerington, *Gen. Supt*.....Carson, Nev.
R. J. Laws, *Supt*. (C. & Col.).....Hawthorne, Nev.
Hume Yerington, *Pur. Agt*.....Carson, Nev.
I. N. Harding, *M. M*.....Carson, Nev.
M. M. Hyde, *M. C. R*.....Carson, Nev.

W

Wabash, Chester & W'n R. R. (*See St. Louis Coal.*)
Wabash, St. Louis & Pacific Ry.
4-8½ g. 3,244 m. 350 lo. 17,330 cars.
A. L. Hopkins, *2d V. P*.....St. Louis, Mo.
A. A. Talmage, *Gen. Man*.....St. Louis, Mo.
R. B. Lyle, *Pur. Agt*.....St. Louis, Mo.
Jacob Johann, *Supt. M. P. & M*.....Springfield, Ill.
M. M. Martin, *Supt. Car Dept*.....Decatur, Ill.
(1) Eas'n Div.: G. W. Stevens, *Supt*.....Peru, Ind.
J. B. Ramsey, *M. M*.....Fort Wayne, Ind.
John McKenna, *M. M*.....Peru, Ind.
Cairo Div.:.....Carroll, Ind.
East'l Div.: B. F. Mathias, *Asst. Supt*.....Rantoul, Ill.
J. McCarthy, *M. M*.....Rantoul, Ill.
(2) Middle Div.: H. C. Rea, *Supt*.....Springfield, Ill.
R. B. Rose, *M. C. B*.....Decatur, Ill.
G. A. Hurd, *Asst. Supt*.....Forest, Ill.
(3) Northern Div.: E. N. Armstrong, *Supt*.....Decatur, Ill.
M. C. B.....Peoria, Ill.
E. B. Hyde, *Asst. Supt*.....Havana, Ill.
(4) Western Div.: R. G. Butler, *Supt*.....Moberly, Mo
W. H. Selby, *M. M*.....Moberly, Mo.
C. S. Buck, *M. C. R*.....Moberly, Mo.
E. Dresser, *Asst. Supt*.....Stanberry, Mo
D. Mon. Div.: C. F. Meek, *A. Supt*.....Brooklyn, Ia
3 g. 23 m. 3 lo. 37 cars.
Walden's Bridge R. R.....Jenia & O., Tenn.
John O. Scott, *Gen. Man*.....Jenia & O., Tenn.
Wallkill Valley.....
J. E. Childs, *Gen. Supt*.....New York, N. Y.
Geo. H. Graves, *Supt*.....Kingston, N. Y.
E. Minshull, *M. M*.....Middletown, N. Y.
W. W. Fowler, *Pur. Agt*.....Middletown, N. Y.
Walla Walla & Columbia Riv. R. R.....(*See Ore., Ry.*)
Walton R. R.....3 g. 10 m. 1 lo. 7 cars.
D. H. Walker, *Pres*.....Monroe, Ga.
Warren & Farnsworth Valley R. R.
3 g. 12 m. 3 lo. 60 cars.
A. D. Wood, *Supt*.....Warren, Pa.
Warwick Valley R. R.....(*See Leh. & Hud. Riv.*)
Wasatch & Jordan Valley R. R. (*See Den. & Rio. Gr.*)
Wasington, Ohio & West R. R. 4-8½ g. 52 m. 5 lo. 87 c.
S. M. Brophy, *Gen. Supt*.....Alexandria, Va
W. Mountjoy, *Act. For. C. D*.....Alexandria, Va
John Harrison, *M. C. R*.....Alexandria, Va
Waynesburg & Washington Rd. 3 g. 29 m. 3 lo. 26 c.
C. E. Bower, *Supt*.....Waynesburg, Pa.
A. M. Kline, *M. C. B*.....Waynesburg, Pa.
Welland Ry.....4-8½ g. 25 m. 4 lo. 147 cars.
William Pay, *Supt*.....St. Catharines, Ont.
Jas. Taylor, *M. M*.....St. Catharines, Ont.
Wm. H. Fay, *M. C. B*.....St. Catharines, Ont.
West End Narrow Gauge Ry.....3 g. 10 m. 3 lo. 13 c.
Rolla Wells, *Supt*.....St. Louis, Mo.
M. M. Hodgman, *M. M*.....Florissant, Mo.
West Feliciana R. R.....4-8½ g. 27 m. 2 lo. 22 cars.
J. B. McGehee, *Pr. & Gen. Supt*.....Bayou Sara, La.
J. A. Thomas, *M. M & C. B*.....Bayou Sara, La.
W. Va., Central & Pittsb'g Ry. 4-8½ g. 50 m. 4 lo. 119 c.
T. B. Davis, *Gen. Man*.....Piedmont, W. Va.
W. E. Porter, *Gen. Supt*.....Piedmont, W. Va.
Geo. W. Harrison, *Pur. Agt*.....Piedmont, W. Va.
E. W. Lippencott, *M. M*.....Piedmont, W. Va.
(*See Ill. Cen.; N. O. Div.*)
(*See Penn. R. R. C. (3) Div.*)
West & East R. R.....5 g. 85 m. 15 lo. 270 cars.
West Jersey R. R.....5 g. 87 m. 14 lo. 240 c.
Western R. R. (of Ala.).....
Atlanta & W. Point Rd.....
Cecil Gabbett, *Gen. Man. & Supt*.....Mont., Ala.
C. D. Wall, *M. M. & C. B*.....Montgomery, Ala.

Western Counties' Ry. 4-8½ g. 67 m. 8 lo. 137 cars.
J. Brignell, *Supt*.....Yarmouth, N. S.
Western Pac. Railroad R. R. 4-8½ g. 157 m. 25 lo. 439 c.
J. M. Hood, *Pr. & Gen. Man*.....Baltimore, Md.
R. J. Adair, *Pur. Agt*.....Baltimore, Md.
David Holtz, *Mast. of Mach.*.....Union Bridge, Md.
J. H. Nussear, *M. M*.....Union Bridge, Md.
Western No. Carolina R. R.....5 g. 210 m. 17 lo. 160 c.
V. E. Mellee, *Supt*.....Salisbury, N. C.
Jno. F. Divine, *Pur. Agt*.....Richmond, Va.
G. W. Gates, *M. M*.....Salisbury, N. C.
Western & Atlantic R. R.....5 g. 138 m. 58 lo. 902 c.
E. A. Anderson, *Gen. Supt*.....Atlanta, Ga.
A. B. Bostwick, *Asst. Supt*.....Atlanta, Ga.
Lazar Collier, *M. M*.....Atlanta, Ga.
W. Kinyon, *M. C. R*.....Atlanta, Ga.
Wheeling, Pittsburg & Baltimore R. R. (*See B. & O.*)
Wheeling & Lake Erie R. R.....267 m. 31 lo. 1,450 c.
M. D. Woodford, *Gen. Man*.....Toledo, O.
O. P. Dunbar, *Gen. M. M*.....Norwalk, O.
John Hillhouse, *Div. M. M*.....Norwalk, O.
Cleve. & Mar. Div.:.....
A. Galloway, *Div. M. M*.....Cambridge, O
Whitby, Port Perry & Lindsay Ry. (*See Mid. of Can.*)
White Water R. R.....(*See Ft. W., Cin. & Lou.*)
Whitefield & Jefferson R. R. (*See Bos., Con. & Mon.*)
Whitneyville & Massapeag R. R. 8 m. 3 lo. 4 cars.
C. Sullivan, *M. & Pur. Agt*.....Whitneyville, Me.
Wicomico & Pocomoke R. R. 4-8½ g. 30 m. 2 lo. 36 c.
L. Shovell, *Pres*.....Berlin, Md.
Williamsport & North Branch R. R.
4-8½ g. 9 m. 2 lo. 4 cars.
B. G. Welch, *Man. & P. Agt*.....Hughesville, Pa.
J. V. Chamberlain, *Supt. & M. M*.....do.
Williamstown & Del. River R. R.
4-8½ g. 9 m. 1 lo. 10 cars.
Samuel Harwood, *Supt*.....Williamstown, N. J.
Wilmington, Columbia & Augusta R. R. (*See W. & W.*)
Wilmington & No'n R. R. 4-8½ g. 85 m. 10 lo. 148 c.
W. H. Hunt, *Gen. Supt. & P. A*.....Coatesville, Pa.
George Rommel, *M. M*.....Coatesville, Pa.
Alex. Maitland, *M. C. R*.....Coatesville, Pa.
Wilmington & Weldon; Northeastern: S. C. Central;
Cheraw & Darlington; Cheraw & Salisbury; and
Wilmington, Columbia & Augusta R. Rs.
5 g. 500 miles 70 locomotives 1,120 cars.
H. Walters, *Gen. Man*.....Baltimore, Bal.
J. F. Divine, *Gen. Supt*.....Wilmington, N. C.
John Bisset, *M. M*.....Wilmington, N. C.
W. H. Thompson, *M. M*.....Florence, S. C.
J. H. Davis, *M. C. R*. (W. & W.).....Wilmington, N. C.
Winifrede R. R.....4 g. 2 m. 1 lo. 65 cars.
Theodore Wright, *Pres*.....Philadelphia, Pa.
Windsor & Annapolis Ry. 4-8½ g. 130 m. 10 lo. 166 c.
J. Innes, *Gen. Man*.....Kentville, N. S.
Wm. Yould, *M. M*.....Kentville, N. S.
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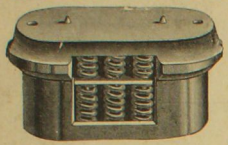

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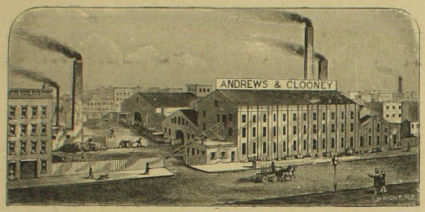

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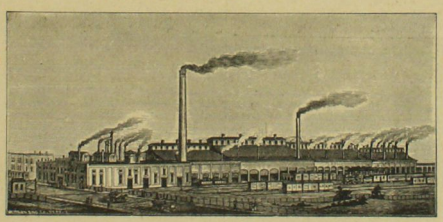

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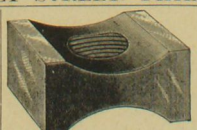

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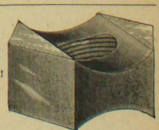

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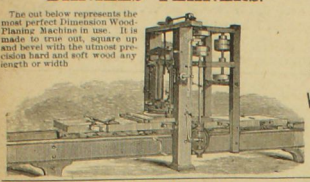

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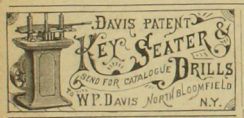

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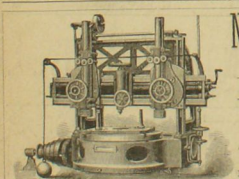

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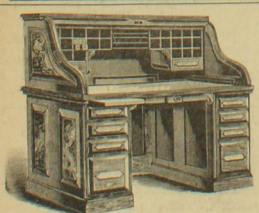

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